Spring Summer 2000 Newsletter

PRESIDENT'S MESSAGE
by Dr. Marlys Misfeldt

Four years have passed since I was first appointed President of the Sports Medicine Council, and many changes have taken place since my first appointment. The biggest change is the introduction of the Sport Medicine and Science Council of Saskatchewan through the amalgamation of the previous Council and the Sport Science Program. The Council has a new look and a new focus. Through hard work of the Council's staff, Mark Henry, Bruce Craven, Scott Julé, and Travis Laycock, the Council will focus on proactive High Performance sport needs in addition to educating Grassroots, Schools, Health Districts, and Recreation Boards.

The Council has many exciting programs to offer the province, everything from the Canada Sport Safety Program, to Sport Sciences, to Medical Coverage and Equipment, to the Team Sport Speakers Bureau. The introduction of the Council's Web Page, Toll Free Number, and new Brochure will allow user groups better access to the many services the Council has to offer.

Sask Sport, Sask Lotteries, and the Department of Municipal Affairs, Housing and Culture have been fully supportive of the changes, and encourage the Council to be a leading participant in educating the province of Saskatchewan's athletes, coaches, and sport affiliates. The Council is being viewed by many sport organizations as the way of the future to develop and enhance Saskatchewan's sport system, so that Saskatchewan can develop a strong core of developmental athletes and help develop the province's High Performance Sport System.

I encourage everyone to use the many programs and services that we do provide. If there are other sport medicine and science related topics or ideas that you wish to discuss or if there are other programs and services that you feel we need to address to better serve the sport and recreation community, please contact us. Our staff at the SMSCS offices in

Regina and Saskatoon are more than ready to listen to any idea or suggestion and help with any problem you may have.

The upcoming spring and summer seasons are undoubtedly going to be extremely busy ones for the Council. Each and every program/service that we currently offer is getting busier as each month passes. As well, we continue to increase our roll as a vital member of various provincial committees through an increased emphasis on promoting the Council and what we have to offer.

SPORT NUTRITION CONSULTANTS ATTEND EDUCATION FORUM

Compiled by Kimberly Braithwaite MSc, PDt
Sport Nutrition Consultant, Sports Medicine and Science Council of Saskatchewan

The Saskatchewan Sport Science Program sponsored an education day for their sport nutrition consultants on October 23, 1999. The featured speaker for the forum was sport nutritionist Barb Marriage from Edmonton. Barb has served as Chairperson for the Sport Nutrition Advisory Committee of Canada, has delivered training workshops to nutritionists and Olympic coaches and has consulted with numerous national teams and individuals. Barb is currently on the Board of Directors of the Sport Medicine Council of Alberta and is the co-author of a sport nutrition manual used nation wide. The sessions she provided to the sport nutritionists provided valuable information, which the consultants have summarized in the following articles.

Macro-Nutrient and Fluid Requirements for Athletes From Muscle Building Sports to Endurance Events

Summary by Carla Coulson, P.Dt.

Carbohydrates

The recommended amount of carbohydrate for non-endurance sports is 55-65%. For an endurance athlete, carbohydrate intake should be increased to 65-70% or 7-10g/kg body weight. For short duration events (<1hr duration), there is adequate muscle glycogen stores available for the exercise session, as long as the athlete is conscious of tapering their workouts prior to competition. There is also no need to "carbohydrate load", as it would likely cause an increase in body weight and muscle stiffness, which can ultimately reduce overall performance. Endurance athletes should consume a high carbohydrate diet each and every day while training. During the endurance competition, consumption of 30-70g of carbohydrate/hr will assist in conserving muscle glycogen stores.

Protein

The amount of protein an athlete should consume also varies depending on the type of sport. If the individual is involved in endurance events, then 1.2-1.4g of protein/kg body weight is advised. Whereas, a strength training athlete may require 1.2 and up to 1.7 g/kg body weight.
(Lemon 1995 suggested 1.4-1.8g/kg). The ultra endurance athlete should be advised to

consume 1.6g of protein/kg body weight. The recommended protein requirement for adolescents, not considering exercise is 1.5g/kg. There is little literature on the protein requirements for physically active adolescents and is therefore difficult to recommend a specific protein intake.

If a sport nutritionist is working with athletes who feel they require a lot of protein to build muscle, the following example illustrates how needs can be met from food sources:

Muscle is made up of only 20% protein. Therefore: 1 lb(454g) x 20% = 90g protein.
90g protein ¸ 7 days = 13g protein/day
1oz. meat/fish/poultry = 7g protein
1/2cup milk = 4g protein

Therefore, to gain 1 pound of muscle in one week, the individual only needs an extra 2oz. of meat/fish/poultry or 1.5cups of milk daily.

Fluids
The ACSM (1996) position statement recommends a fluid schedule of:
500ml -------- 2hrs prior to competition
150-300ml --- every 20 minutes during the event

For events >60minutes, a dilute glucose and electrolyte solution is advised. Hyponatremia occurring in athletes is most likely a concern when the exercise session is greater than 4 hours duration. When mild hyponatremia develops, usually an increased salt appetite will result. If severe hyponatremia develops (<130mmol), nausea, headache, confusion and slurred speech will be experienced. Some of the reasons for the development of hyponatremia are: voluntary over hydration, consumption of a sodium-free beverage during prolonged exercise, genetics (some individuals have higher sodium losses), abnormal renal function and an increased antidiuretic hormone release due to pain. To replace the sodium lost in sweat, improve palatability and help maintain extracellular fluid volume, 20-30mmol/l of sodium should be added to a replacement beverage. The sodium contents of some common carbohydrate-electrolyte sport drinks are: PowerAde 5mmol, All Sport 10mmol, Gatorade 18-30mmol.

Aesthetic Sports & Disordered Eating
Summary by Michele McDonald, P.Dt.

If you suspect disordered eating with one of your athletes you must privately confront them. This was one of many recommendations given by Barb Marriage, Clinical Research Dietitian. Whether the athlete comes to you in confidence or you identify warning behaviors, act quickly within an atmosphere of respect and trust. This is a complex area that few consultants or coaches feel adequately equipped to deal with. Your plan should include encouraging the athlete to meet with a psychologist. Relate your concerns to performance, energy and ability to recover, not weight changes. Two actual cases were studied as a means to identify method of approach and key areas of discussion. The following topics were highlighted:

· information about body composition and metabolism that applies to the athlete; avoid body fat analysis and focus on lean body mass.
· negative effects of weight cycling, a low calorie intake and prolonged fasting on insulin and regulation of blood sugar.
· importance of pre-training/event and recovery meals/snacks; a low fat diet combined with an adequate intake of carbohydrate, protein, fluid, calcium, and iron -- emphasize breakfast.
· dangers of laxative or diuretic abuse; overuse of caffeine; excessive exercise.

Legitimize the athlete's feelings and preoccupation with appearance and weight. Identify the athlete/coach/parent's self-imposed food rules/fears and expect resistance. If they are under 18, discuss the situation and your involvement with their parents. Give specific direction with strict guidelines and recommendations. Do not expect immediate compliance with your suggestions or trust the situation will resolve itself. Help the athlete understand the physiological changes of adolescence, to appreciate their genetic potential and to perform their best regardless of weight and size. Provide follow-up and support with patience and persistence. The effort is necessary if your goal is to make a difference.

Ergogenic Aids
Summary by Stephanie Thoms, P.Dt.

Of the many topics discussed at the Sport Nutrition Consultant Forum, the use of ergogenic aids by athletes was addressed. In the context of sport, ergogenic aids can be broadly defined as a technique or substance used for the purpose of enhancing performance. Ergogenic aids have been classified as nutritional, pharmacological or psychological and range from the use of accepted techniques such as carbohydrate loading to illegal and unsafe approaches such as anabolic steroid use. Our guest speaker, Barbara Marriage, provided a general overview of the most widely used ergogenic aids to date. The ergogenic aids were discussed in terms of what the product claims to do and what the product actually does i.e. “claims” vs “facts.” Many interesting ergogenic aids were addressed such as sports drinks, sports bars, antioxidants, caffeine, glycerol, carnitine, chromium picolinate, ginseng and bicarbonate loading. Discussed in greater detail was creatine, the “hottest” ergogenic aid presently being used by many athletes. Barb’s summary of creatine indicated that it has been shown to enhance anaerobic power and muscular strength however no long-term side effects to date are known.

Barb stressed that it is not realistic to expect athletes to stop using ergogenic aids. However, as Professional Dietitians, it is our responsibility to become well informed of the various side effects in order to facilitate safe use of ergogenic aids by athletes. When evaluating the safety and efficacy of various nutritional products one must be aware of who is selling the product and what their financial interest is. Furthermore, it is important to determine whether scientific data or merely anecdotal evidence supports product claims.

In conclusion, Barb emphasized that ergogenic aids should never replace a well-balanced diet. If however athletes insist on using ergogenic aids then we need to make it safe for them. Thus, it becomes imperative to educate oneself regarding the risks and benefits of ergogenic aids.

Nutritional Supplements
Summary by Brenda Comfort, M.Sc., P.Dt.

Why Ergogenic Aids?
Athletes often consume nutritional supplements to get the competitive edge. However, nutritional supplements should not replace a sound nutritional program. The strongest ergogenic aid is actually Carbohydrate (CHO)! Athletes and coaches need to start thinking of CHO as a performance-enhancing nutrient.

Carbohydrate
When to Consume Carbohydrate:
Before the Event: to maximize glycogen stores in the liver and muscle
During Exercise (if greater than 60 minutes): to maintain blood glucose and use for energy
After Exercise: To re-synthesize glycogen and hasten recovery

How Much To Consume Before Endurance Events:
· 55-60% of energy or 5-6 grams CHO/kg body weight/day
· 3 days prior to event: 70 % of energy from CHO (or 7-10 grams CHO/kg/day)
· Can be accomplished by increasing Grains, Vegetables and Fruit

How Much to Consume During Endurance Event:
· 30-60 grams CHO/hour
· or 125-175ml Sport Drink every 15 –20 minutes
· Sport Drink should be 6-10% CHO

How Much to Consume After Endurance Event:
· Need to Replace Glycogen
· 50 grams CHO within 2 hours
· If multiple events or training sessions during the day, consume 50 grams CHO within 30 minutes after the activity
· Protein may enhance glycogen re-synthesis (3:1)

Fat Loading
Claim: High fat diet will increase use of fat as fuel source
Fact: Decreasing CHO will impair performance

Protein Supplements
Some groups of athletes use protein and amino acid supplements in hope to increase muscle mass and spare protein as fuel source. Fact: Athletes can meet their protein

needs easily through dietary intake. In fact, amino acid supplements are not more easily absorbed.

TRAINING FOR MUSCLE MASS, STRENGTH, AND POWER

Shawn Kuster BEd, Mkin, CSCS
Exercise Physiologist Consultant, Sports Medicine and Science Council of Saskatchewan

Part I – Training for Muscle Hypertrophy

It seems that most athletes, regardless of sport have realized the value of resistance training to enhance athletic performance. However, there still appears to be a lot of confusion as to the best way to train to improve muscle hypertrophy (mass), strength, and power. Since each of these characteristics requires a unique adaptation by the muscle, the manner in which they are trained should also be different. Studies have shown that the pyramid system of training in which the athlete performs sets with a progressively heavier resistance with a corresponding decrease in the number of repetitions with the intention of developing mass, strength, and power simultaneously within the same workout is much less effective then training each characteristic separately within its own cycle in a periodized model. The purpose of this series of articles is to provide an overview of different resistance training protocols that can be used to develop muscle mass, strength, and power.

Although one of the main goals for athletes in the off-season is to get stronger and more powerful, this may not be achieved if the training program does not include cycles that focus specifically on increasing muscle mass or muscle hypertrophy. Morehouse (1976) found that a hypertrophied muscle possessed a greater potential to gain strength and power than a non-hypertrophied muscle. Other studies have also indicate that lean body mass may be the most important factor for muscular strength and power gains (Komi, 1979; Stone et al, 1981). This may be the result of an increase in the contractile properties of the muscle associated with hypertrophy that are then refined during strength training, resulting in greater than normal force production.

Physiological Causes of Hypertrophy

When muscles are exposed to a progressive resistance weight-training program they must gradually adapt to the new loads that are placed on them otherwise over training will occur. There are several biochemical and structural changes that occur within muscles that may result in an increase in the cross-sectional area of individual muscle fibers. They are:

1) Increase in the number and/or size of the myofibrils per muscle fiber due to an additional number of myofilaments
(Gordon, 1967; MacDougall, Sale, Elder, Elder, & Sutton, 1976).

2) Increase in the total amount of the contractile protein, particularly in the myosin or thick filament of the
sarcomere Gordon, 1967; Penman, 1969; MacDougall et al, 1979).

3) Increase in the capillary density per muscle fiber (Fox, Bowers, & Foss, 1989).

4) Possible increase in the amount of sarcoplasm in a muscle fiber (Morehouse & Miller, 1976).

5) Increase in the amount and strength of connective, tendinous, and ligamentous tissues (Tipton, Matthes, Maynard, & Carey,
1975).

Hyperplasia and Muscle Hypertrophy

It has been suggested that an increase in muscle mass may be the result of a process known as hyperplasia. Hyperplasia is the enlargement of a muscle through an increase in the number of muscle fibers. This theory is based on studies that have demonstrated hyperplasia in animal muscles. Studies using human subjects have not supported this theory (MacDougall, Sale, Elder, Elder, & Sutton, 1976; MacDougall & Sale, 1984).

MacDougall and Sale (1984) investigated the differences in muscle structure of the biceps brachii muscle among elite bodybuilders, novice bodybuilders, and untrained subjects. Needle biopsies were used to extract small samples of muscle tissue. Using an electron microscope the number of muscle fibers for a given area was counted. The results of the study showed that the average number of fibers were the same for each group although cross-sectional area of the muscle differed. This indicated that differences in cross-sectional area were the result of an increase in the size of the muscle fibers rather than an increase in the number of fibers.

Training To Increase Muscle Hypertrophy

In order for muscles to be enlarged beyond their normal size, they must be exposed to a training stimulus that is sufficient to cause overcompensation in the muscle. Typically high volume, low intensity training is used for this purpose.

Schmidtbleicher (1992) outlined four programs that could be utilized four times per week for 10-12 weeks, to increase muscle mass.

1) Method one requires the athlete to perform 3-5 sets of 8-10 repetitions at an intensity of 80% of 1 repetition maximum (1RM) with a three-minute rest interval.

2) Method 2 consists of four sets of progressively increasing intensity (70-80- 85-90% of 1RM) performing repetitions of 12, 10, 7, and 5 respectively with a two-minute rest interval.

3) Method 3 requires an intensity of 60-70% of 1RM for 3-5 sets of 15-20 repetitions with a two-minute rest interval.

4) Method four utilizes an intensity of 85- 95% of 1RM for 3-5 sets of 8-5 repetitions with a three-minute rest period.

Renowned Soviet biomechanist, Vladimir Zatsiorsky (1995) illustrated how training with sub maximal loads, similar to the protocols above, stimulated both the slow and fast twitch muscle fibers while training with maximal activates the fast motor units exclusively. For this reason Charles Poliquin recommended that an athlete at some point in his/her training should attempt to develop muscle mass in only the fast motor units by performing 6-10 sets of approximately 6 repetitions with as heavy as load as possible with a 2-3 minute rest between sets.

Although many different protocols exist for developing muscle mass, it is important to remember that not all athletes respond equally to the same program, therefore it is important to experiment to find which protocol works best. Having multiple programs available to the athlete also provides for variety in the workouts, alleviates boredom and also minimizing the risk of an athlete reaching a plateau in his/her training.

In the next article I will examine concepts in strength development.

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FIRST QUARTER COUNCIL UPDATE

Canada Games Programming

Many of the Canada Games Teams are starting to prepare for the 2001 Canada Summer

Games in London, Ontario. To date 11 out of the 21 teams have started or have scheduled sport science programming in preparation for the Games. The Director of Athletes Services has met with all teams, and proactive programming will be taking place once all teams have assigned their coaching staff.

Dairy Foundation High School Athletics Nutrition Workshops
A cooperative sponsorship with the Dairy Foundation of Saskatchewan has resulted in numerous scheduled Dairy Nutrition Workshops at High Schools throughout the province. The workshops are 1-½ hours in length and focus upon healthy eating, carbohydrates, proteins, fats, importance of fluids and calcium, and the importance of a pre-competition meal.

Sport Medicine and Science Directory
The Council has started preparation on a Directory for Sport Medicine and Science Professionals. The Directory is being developed so that athletes and coaches can obtain better sport medicine and science services through out the province. The projected release date for the Directory will be some time in the Fall of 2000.

High Performance Coordinating Committee
Discussions have been held regarding "High Performance Sport" with representatives from the Sport Medicine and Science Council, Sask Sport, Provincial Government, and the Coaches Association. A variety of issues have been discussed including Major Games Preparation and Funding Strategies for the sports.

Millennium Sport Conference (The Coaching Continuum – Novice to National Champion)
Plans are under way for the Millennium Sport Conference being held October 2000 in Saskatoon. The conference sponsored by the Coaches Association of Saskatchewan, Sport Medicine and Science Council of Saskatchewan, Sask Sport Inc., Sport Physio Therapy Canada, Saskatchewan Association of Sport Medicine, and the Jeux Canada Games Foundation involves 3 days of workshops and presentations for coaches and professionals involved in sport throughout Saskatchewan.

Saskatchewan Summer Games 2000
The Council is planning a medical in-service in May, as well as planning programming during the Games for Sport Medicine and Science. Currently, planning stages of developing a workshop for the medical team is in works, and will be conducted by Dr. Mike Nicholls and Bruce Craven.

Sport Medicine and Science Brochure
The Council will be doing a brochure blitz through out the Province. A newly designed brochure outlining all services, eligibility for services, and contact numbers will be in circulation by the end of April 2000. Contact the office if you wish to receive one.

Hockey Trainers Project
The SMSCS in association with the Saskatchewan Hockey Association initiated a pilot

project to develop a base of "hockey trainers" for the S.H.A.'s Sask First Bantam and Midget Programs. One trainer from each of the eight zones was recruited through mail-outs done by SMSCS. These trainers then attended the two SHA Identification Tournaments. We provided a Supervisor for both events where he gave instructional workshops on injury care and prevention as well as acting as the head therapist for the weekend. The two supervisors were Bruce Craven (Midget Tournament) and A.J. Tabin (Bantam Tournament). This initiative falls in line with our proposed new sport medicine initiative, the TEAM SPORT TRAINERS PROGRAM.

Medical Personnel at Events and Equipment Loaner
We continue to provide medical personnel at various sporting events throughout the province. Some of the more notable one's include the Labatt Brier, CIAU Men's Hockey Championship, North America Short Track Speed Skate Championship, and a world ranked Squash event in Regina.

Team Sport Speakers Bureau
After a six-month hiatus, a major emphasis will once again be placed on this program. It is hoped that all plans will be finalized to "kick off" the program with a press release by the beginning of June. More details will be forthcoming very shortly.

Pharmaceutical Association Partnership
Plans are progressing very well on this partnership. Currently we are in the planning stages to get a Banned Substance Booklet in the hands of every pharmacy in the province. The Pharmaceutical Assoc. would definitely like to be able to provide education on this topic to athletes across the province when they are getting a prescription filled or purchasing over the counter medication.

Manuals for Sale

STRENGTH AND FLEXIBILITY TRAINING MANUAL 2nd Ed.
· Muscle Physiology
· Strength Training
· Flexibility Training
· Program Design
· Warm-up and Cool-down Equipment
· Core Strength Exercises
· Weight Exercises for Upper and Lower Body
· Tubing Exercises for Upper and Lower Body
· Body Weight Exercises for Upper and Lower Body
· Plyometric Exercises for Upper and Lower Body
· Flexibility Exercises for Upper and Lower Body
· Now over 150 pictures showing proper technique

MENTAL TRAINING MANUAL
Written by Kevin Spink Ph.D.
· Self Confidence
· Goal-Setting
· Imagery
· Recover
· Concentration
· Stress Management
· Self-Talk
· Self-Management and Arousal Control
· Post Game - The Tool Box

EXERCISE PHYSIOLOGY
TRAINING MANUAL
Written by K. Shawn Davison
· Energy Systems Training Principles
· Anaerobic Alactic Anaerobic Lactic
· Aerobic System Physiological Testing
· Planning Pitfalls

SNAC for Athletes MANUAL
· Carbohydrates
· Fluid Replacements
· Fats
· Iron
· Proteins
· Shape Management
· Iron
· Dine and Dashing

ATHLETIC TAPING
· Objectives of Taping and Wrapping
· Injury Assessment
· Taping Considerations
· Foot and Ankle
· Knee
· Hand and Wrist
· Elbow
· Muscle and Tendon

SPORT FIRST AID
· Role of the Sportsaider
· Body Basics
· Injury Prevention
· Emergency Action Plan and Procedures

· Life Threatening Injuries
· Injury Assessment and Management
· Common Injuries

DRUG CLASSIFICATION HANDBOOK
· Banned Classes and Methods
· Restricted Substances
· Supplements, Herbals, Homeopathics, etc.
· Permitted Substances
· Banned Substances

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Mail Order to:
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College of Kinesiology, U of S
105 Gymnasium Pl.
Saskatoon, SK., S7N-5C2

COACHES:
Gain an Awareness to the Issues Facing your Athletes regarding Physique & Eating Behaviors
Rod Hidlebaugh B.A. (Hon), B.Sc. PT (Spring 2000)

During the past decade there has been an increase in the awareness of fitness and wellness. Psychosocial influences have demonstrated a role in many aspects of human behavior. Behaviors enhanced by the mass media have been the pursuit of having a physically fit, slim, lean body. From movies, television, magazines, and miracle diets, to workout videos, our culture has created an enormous focus on the 'ideal' body shape. To be accepted in our culture many men and women believe it is necessary to meet the ideals that society stresses. Therefore, women and men spend hours worrying about how their body appears, what cloths to wear to best display how they want their physique to be viewed by others, and generally how they look. Thus, with the concerns of trying to attain what society calls the 'ideal' physique, it would be reasonable to say that some female/male adolescents and adults are self-conscious of their appearance, especially in front of others. With a fixation on the attainment of the 'ideal' figure some may have developed, or at least, are likely to have an altered perception of their body image, have an increased social physique anxiety, have general depressed self-concept, self-esteem, and may have developed disordered eating habits that may predispose them to anorexia, bulimia, or reverse anorexia (fear of being too small, mainly experienced by body builders).

It is quite plausible that female athletes involved in sport where their figures are constantly displayed in front of judges and audiences and males involved in sports where 'making weight' is focused on, may have a greater propensity towards anxiety surrounding the shape of their body. The literature is mounting on those sports where athletes' figures are on display, in that they may have altered behaviors regarding their bodies. For example, in sports such as dancing, gymnastics, and figure skating, there is an increased risk to develop an altered perception regarding physiques and eating behaviors. Coaches, parents, health professionals, and peers alike who have contact with these athletes, must be aware of the potential problems that could arise from participation in high evaluative type sports. An awareness of the possible behaviors that might preclude one or indicate that something is not "right", attentiveness to the athlete's behaviors or change in behaviors is a necessity. A checklist of some perceptions/perceptions that may indicate a problem, include the following (but not exhaustive):

(1) Distorted perception of body shape (i.e., wants to lose weight even when below 'normal' average
(2) Below normal weight (with an intense fear of obesity)
(3) Wide fluctuations in weight over short periods of time
(4) Cladestine eating (i.e., large quantities of food wrappers in lockers/room)
(5) Socially withdrawn (avoiding eating with teammates/peers)
(6) Evidence of purging after eating (leaving to bathroom after eating or eating large

quantity of food, or evidence of vomit smell in bathroom or garbage)
(7) Laxative or diet pill usage and abuse
(8) Excessive exercise (outside the training regime)
(9) Highly irritable/depressed (and not due to other causes)
(10) Erratic changes in performance of the athlete (Sport Medicine Council of Canada, 1990)
(11) Excessive concern about
gaining weight
(12) Feelings of shame or guilt about eating
(13) Low self-esteem
(14) Dizziness, headaches
(15) Constipation, diarrhea, bloating
(16) Blood shot eyes
(17) Dry skin & hair
(18) Cold intolerance
(19) Muscle weakness

(Adapted from the Canadian Association for the Advancement of Women and Sport and Physical Activity, 1994)

Coaches do not cause eating disorders, but they can precipitate the disorder through unconscious or thoughtless comments about figure and weight. As well, coaches have such a close relationship with the athlete that they can help prevent an eating disorder with close attention to signs and symptoms and action. Coaches should have a plan in place, if they suspect a problem. This could include an interview with the athlete, where the coach is entirely supportive, honest and non-judgmental with the athlete. Parents are required to be notified if a minor is involved, and if over 18 years of age then the responsibility ultimately falls upon the athlete. The coach can assist in recommending consultation with physicians, psychologists, or a dietician.

To assist in the prevention of distorted behaviors and perceptions about physique and eating habits, coaches can implement the following suggestions:

(1) De-emphasize weight (don't measure weight or comment on it)
(2) Extinguish group weigh-ins
(3) Eliminate unhealthy rapid weight loss practices
(4) Have an awareness to the signs and symptoms
(5) Emphasize a balanced approach to performance (fitness, strength, flexibility, skill)
(6) Treat all athletes as individuals

(Adapted from the Canadian Association for the Advancement of Women and Sport and Physical Activity, 1994 ; Lindeman, 1994).

Many females and some males experience the issues presented in this article because of our societal pressures. The purpose of the present article is to bring an awareness that there might be further perceived pressures that athletes place on

themselves to attain the 'ideal' physique, due to the nature of participating in a particular sport. As well, if one suspects there is an issue regarding improper behaviors then consultation with professionals may be required.

Health professionals, coaches, and parents need to emphasize healthy lifestyle choices. Athletes already have a huge amount of pressure from society, and those involved in highly subjective evaluative sports, or sports where there is a subculture to 'make weight', do not need a coach or anyone else to focus on their figure. We need to coach them the skills they have, not the skills they might have if they just lost a little weight.

The issues presented in this article, will typically lead to a decrease in performance and in some instances can be fatal. Good training and nutrition are the keys for successful performance.

For further information contact:

· Public Health Services (in Saskatoon): (306) 655-4600
· Centralized Intake for Mental Health Services (in Saskatoon): (306) 655-7950
· Student Health Center at University of Saskatchewan: (306) 966-5768
· Student Counseling Services at University of Saskatchewan: (306) 966-4920
· National Eating Disorders Information Center (NEDIC)
  Toronto General Hospital
  200 Elizabeth St., Room 2-332
  Toronto, ON. M5G 2C4 (416)340-4156

Sources for Males with eating disorders:

· www.mhource.com.edu/psytimes/p950942.html
· www.zeusnet.com/bjblinderblmales.htm
· www.zeusnet.com/bjblinder/anmales.htm
· www.zeusnet.combjblinder/atpmales.htm

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The Coaching Continuum – Novice to National Champion

October 13 – 15, 2000
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- Physiological Monitoring of Training – Utilizing a yearly planning instrument
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- Aerobic Power Training
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- New Approaches to Recovery
- Effective Use of Creatine/Whey Protein
- Sissel Ball Training
- Return to Play Guidelines

- Tissue Healing Process
- Development Sport Concepts
- Sask Sport's Children in Sport Initiative
- Transition Period – Training Programs
- Psych/Socio Prep for Multi-Sport Games
- Optimizing Youth Sport Participation
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- Planning a Mental Preparation Program
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- Mental Training for Team Sports
- Agility Training
- Speed Training

To receive a registration brochure or for more information
Contact: The Coaching Association of Saskatchewan at 975-0898

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& Rod Hidlebaugh B.A. (Hon), B.Sc. PT (Spring 2000)

What's out there?
It has been long thought that pre-event passive stretching increases flexibility and thus prevents injuries. From recent studies this does not occur. Large randomized clinical studies involving military recruits found no differences in muscle injuries between those who did warm-up type pre-exercise static stretching versus those who did nothing. These studies also found that the least fit had 14x the risk of muscle injury, as well in another study, the researchers demonstrated that those recruits who did additional static stretching (i.e., before lunch, supper, & bedtime) had 50% less muscle injuries. Furthermore, research is beginning to demonstrate that stationary cycle and sub maximal activity

results in a decrease in passive muscle tension. The evidence is slow in coming but the research is starting to support the idea of active type stretching to not only prevent injuries, but also maybe more importantly improve performance.

Increased Performance?
Some theorists suggest that an increase in extensibility of muscle tissue allows for efficient and effective joint motion, and an ease of movement within an obtainable range of movement, which is otherwise not achievable with shortened muscles and tendons (Worrell, Smith, & Winegardner, 1994). As well, with greater extensibility in muscle tissue researchers have found significant increases in muscle force production as compared to those who did not increase their joint ROM (Calder, 1999; Gleim, & McHugh, 1997). If an athlete achieves better flexibility, and the muscle tissue becomes more efficient /effective and produces more force, it could be hypothesized that an athlete may have an increase in performance. Research in this area on the benefits of flexibility and its relationship to improved performance is still limited and conclusions made in this respect are cautioned until more support is demonstrated in the literature.

Warm-up:
(1) Active warm-up to get a light sweat (eg. Jumping jacks, mountain climbers, skip rope, exercise bike, light jog etc…). Anything to GET THE BLOOD CIRCULATING.
(2) Stretches to address the athlete's specific needs of the sport.
· Passive stretches: hold for minimum of 30 seconds repeat 2x.
· Active stretches: into stretch 3 seconds, hold for 5, out of stretch 3 seconds repeat 5-10x.

Activity:
· Sport specific

Warm-down:
(1) 5-10 min active exercise a slow pace (eg exercise bike, jumping jacks, walking etc..). To keep the blood flowing!
(2) Passive stretches: hold for minimum of 30 seconds repeat 2x.

Post-Warm down:
(1) Active warm-up to get a light sweat (eg. Jumping jacks, mountain climbers, skip rope, exercise bike, light jog etc…).
(2) Active stretches: into stretch 3 seconds, hold for 5, out of stretch 3 seconds repeat 5-10x.
(3) Passive stretches: hold for minimum of 30 seconds repeat 2x.

Daily Flexibility Training
Incorporate both static and dynamic stretching into a flexibility program. Keys to maximizing the stretching experience:
(1) Increase blood circulation through active warm-up (eg. Jumping jacks, skip rope, exercise bike, roller-blading) for 5-10 minutes
(2) Stretches need to address the athletes specific sport needs

(3) Athletes need to maintain good alignment, holding shoulders and pelvis in proper alignment.
(4) Slow and smooth stretches
(5) Duration of stretches: Static: 30 seconds – 1 minute holds (repeat 2-3x)
Active: into stretch-3secs-hold 5s- out of 3s
(6) Frequency: Static: 2-3x/day
Active: 2-3x/day
(7) Control: Should have control throughout the stretching program.

The Don'ts:
(1) Do not cause pain
(2) Do not rotate shoulders or trunk (spine)
(3) Keep feet lined up, and do not allow them to turn out
(4) No bouncing or jerky movements
(5) Do not work excessive passive range of motion, until you have it actively

References

Calder, A. (1999). Flexibility-stretching the paradigm. Australian Institute of Sport.

Gleim, G.W., & McHugh, M.P. (1997). Flexibility and its effects on sports injury and performance. Sports Medicine, 24, 289-299.

Worrell, T.W., Smith, T.L., & Winegardner, J. (1994). Effect of hamstring stretching on hamstring muscle performance. JOSPT, 20, 154-159.

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ASK THE DOCTOR - JUMPER'S KNEE

Mike Nicholls, B.Sc., M.D., C.F.P.C., Diploma Sport Medicine

Dear Doctor:
When I am jumping, kicking, or running, my knee hurts. A friend mentioned a term called "jumper's knee" or "patella tendonitis". What is this and how is the best way to treat it?

Of all overuse sport injuries anterior knee pain, or patellar femoral pain, is one of the most common. Patellofemoral or anterior knee pain is only a symptom and can be caused or contributed to by a variety of problems such as trauma, leg alignment or length abnormalities, foot problems, patellar tracking problems, patellar subluxation, vastus medialis tendonitis, quadriceps tendonitis, iliotibial band (ITB) tendonitis, or patellar tendonitis, to name a few.

Patellar tendonitis or jumper's knee is pain anywhere between the lower end of the patella (knee cap) and the attachment of the patellar tendon with the lower leg bone (tibia). Most commonly painful areas are at the lower end of the patella and near the attachment at the tibia (tibial tubercle). It is thought that the pain is a result of inflammation and microscopic tears in the patellar tendon. Factors that seem common to this injury are certain at-risk sports (jumping and running) and the practice of training at one sport "year-round".

Taking a careful history is the most important step towards making the diagnosis of jumpers knee. In most cases the pain has been of gradually onset, was not the result of an injury, is worse during or immediately after activity, and particularly worse with activities such as running, stair climbing or jumping. A multitude of intrinsic factors (being "knock-knee-ed", flat-footed, obese or inflexible) and extrinsic factors (hill-running, excess shoe-wear, running on uneven terrain, or excessive activity) can precipitate or predispose to developing jumper's knee. The patient will often have been able to continue activities for up to several months while experiencing pain. A careful physical examination is also extremely important in ruling out other causes of knee pain both serious and benign. For example, many serious hip problems in adolescents can initially present as knee pain.

In a growing adolescent, jumpers knee can refer to Osgood-Schlatter's disease, or inflammation at the growth plate (apophysis) of the tibial tubercle. This is not a disease in the true sense but is inflammation that resolves usually once growing is completed. It is common between the ages of 8 – 13 in females and 10 – 15 in males. It can result in a prominent lump or bony nodule below the patella that becomes permanent and is only a problem for people who work on their knees (brick or carpet layers). Casting or surgical treatment is used only as a last resort.

Successful rehabilitation involves first making the correct diagnosis and identifying any precipitating factors. Rest, ice, proper warm-ups, avoidance of aggravating activities or actions, and anti-inflammatories can all be used initially. Once pain free, attention is directed to correcting flexibility or strength deficiencies. Modified activities that do not

cause pain can allow an athlete to maintain a level of fitness without compromising injury recovery. Physiotherapy can be integral in identifying muscle imbalances, flexibility problems or training deficiencies and is an important part of recovery by teaching rehabilitation and maintenance exercises. Some athletes benefit from the use of patellar taping, orthotics or a patellar tendon brace depending upon associated precipitating factors. As the athlete progresses, sport specific exercises and a graduated return to practice is allowed.

Complications include the development of chronic pain, tibial tubercle avulsions, patellar stress fractures and patellar tendon ruptures, but thankfully these are rare.

Although rarely a serious problem, patellar tendonitis can be an extremely frustrating and challenging problem for the athlete, coach and medical staff. If taken lightly symptoms can persist for many months and occasionally many years. Early aggressive therapy is best. With a conscientious effort from the athlete and guidance of the medical team it can also be a very gratifying problem to overcome and prevent. Don't let Jumper's Knee keep you grounded!

ATTENTIONAL FOCUS AS A BASIS FOR MENTAL SKILLS - INTERVENTION IN SPORT

Dr. Tom Graham, SMSCS Consultant

Top performance in sport involves attending to the most appropriate features of a task. Selective attention (as this is called) refers to a process by which relevant information is selected for attention and irrelevant information is ignored. Let's take an example from baseball. As a pitch is released, the batter is more likely to attend to the rotation of the ball than the size of the crowd. The reason is simple. Identifying the pitch is considered a fundamental aspect of hitting and crowd size is not. This process of selection is essential given the amount of information that athletes are bombarded with. In sport, selective attention to relevant information and active avoidance of irrelevant information is central to successful performance.

In the sport psychology field, the assessment of selective attention has been dominated by the Test of Attentional and Interpersonal Style (TAIS; Nideffer, 1976). The TAIS and sport-specific versions of the instrument have been used extensively in examining attentional styles across a variety of athletes (e.g. Albrecht & Feltz, 1987; Nideffer, 1987, Summers, Miller and Ford, 1991).

The TAIS was developed based on two main theoretical assumptions. The first is that attention involves two dimensions. These dimensions are attentional width and direction. Attentional width (broad-narrow) refers to the range of cues that receive attention while attentional direction (internal-external) refers to the source of the cues. These dimensions form a matrix representing four attentional styles. These styles are outlined below.

· Broad-External: - Optimal for reading the environment (e.g. quarterbacks pre-read in football)
· Broad-Internal: - Optimal for developing/using strategy (e.g. quarterback selects appropriate play from the menu of Possibilities)
· Narrow-External: - Optimal just prior to a response (e.g. quarterback narrows attention and focuses externally on intended receiver)
· Narrow-Internal: - Optimal for completion of individual skills and technique (e.g. quarterback delivers ball in a technically sound manner)

The attentional requirements of most sport situations fall within these four attentional styles. For example, a free throw in basketball requires a narrow -external form of attention at the moment of execution. Selecting the most effective strategy against a full court press requires a broad internal focus. Thus, effective attention results from adopting the appropriate attentional style to match task requirements. Flexible attention involves moving among the four attentional styles as the situation demands. In summary, an individual needs to be able to adopt all attentional styles to function effectively.

The second major assumption of Nideffer's model is that individuals tend to have attentional strengths and limitations. Some athletes are heavily analytical and don't take enough information from their environment. Other athletes read the environment very well, but aren't sufficiently analytical to respond constructively. In competition, athletes tend to use their strongest or most preferred attentional style. The weaker attentional areas are often ignored even when the situation calls for them. The issue is one of confidence. In an ideal world, the athlete is on top of all attentional areas and can confidently apply the style that best fits the situation.

The TAIS consists of 17 subscales. Six are devoted to attentional style while 11 measure behavioral or interpersonal style. Of the six attention-related subscales, three relate to effective attentional style: Broad-External (BET), Broad-Internal (BIT) and Narrow Focus (NAR). Three relate to ineffective attentional style: Overload External (OET), Overload Internal (OIT) and Reduced Focus (RED). Increases in competitive arousal are associated with a breakdown in the ability to use certain attentional styles. The OET, OIT and RED subscales measure this.

An important point is that athletes are generally committed to interventions based on TAIS results. There are several reasons for this. First, the TAIS allows athletes to describe themselves. By completing the instrument, athletes identify their own attentional strength and limitations. Then, they simply work on the limitations. The bottom line is that athletes set the direction of the intervention. In this scenario, athlete commitment is higher than if a mental trainer arrives claiming to know what everyone should work on. A second reason for athlete commitment is the consensual validation process. After the TAIS is completed and scored, a written profile is given to the athlete. At this point, the athlete is asked to validate the profile. Specifically, they are instructed to put a line through anything they feel is inaccurate. What they're left with is a profile they're committed to as accurate.

The following are TAIS profiles from three different sports (rowing, volleyball and synchronized swimming). The profiled athletes are all elite (at the provincial team level and above) and have a variety of attentional strengths and limitations. Hopefully, the profiles illustrate how paper and pencil tests can provide a firm and objective basis for mental skills intervention in sport.

Elite Rower
Attentional Scales:
X describes her attentional strength for competition as an ability to narrow her focus. This attentional area is highly developed (NAR=98th percentile). A narrow focus involves attending to personal technique while in the boat. Focusing on main technical points for a given number of strokes is an example of this. X's profile suggests that she has confidence in this attentional area under conditions of high competitive arousal (RED=95th percentile). In other words, she can expect to access narrow information easily in important, high profile competition. In summary, X feels most comfortable with the technical part of her rowing. During competition, she'll probably focus here before using other attentional areas.

X's broad external focus is her most limited attentional area. A broad external focus involves taking information from a wide field of view. In a single, this includes awareness of where the other boats are and what they're doing. In a crew boat, it includes an awareness of 1) other boats and 2) what other members of her crew are doing. Her score, under conditions of normal competitive arousal, is low (BET=1st percentile). X's score suggests that, while the technical part of her "game" is in great shape, the tactical part has room for improvement. Specifically, X may not always take in enough broad external information to make appropriate changes to her race plan during competition. Her OET or overload external score indicates that she has similar difficulty accessing "outside" information under conditions of high competitive arousal. In summary, development of the broad external attentional area represents tremendous upside for X.

X's broad internal attentional focus is mid-range (BIT=35th percentile) and has room for improvement as well. A broad internal focus involves two forms of information. The first is race plan recall during competition. Talking with X, her race plan involves rotating through main technical points for a given number of strokes. This is narrow attentional information and X has a great handle on that. Consequently, her race plan recall during competition is probably not a concern. The second broad internal area is problem solving and this may be the area that can be improved. Problem solving in competition involves 1) taking broad external information from other boats then 2) choosing a best response based on that. Since access to broad external information is limited (1st percentile), X may not always have the fuel to make her best decisions or responses. Decision making ability is naturally strong. However, the information needed for good rowing-specific decisions is not always available. A look at X's decision making and information processing scores confirms this. Decision making (OBS) is at the 99th percentile. X obviously feels that her natural decision making ability is solid. However, information processing is low (INFP=8th percentile) and seems limited by her broad external focus (1st percentile). Without this information from other boats, X may not respond to

changing race situations as quickly and appropriately as she'd like. In summary, if she has the outside information, she'll take advantage of her strong decision making skills in competition. If she doesn't have this information, she won't be able to use these decision making skills to the same extent.

Positives:
X's attentional strength is an ability to narrow her focus. This is positive. It allows her to stay on top of the most controllable aspect of her sport: her own performance. A focus on technique during competition also represents an effective coping strategy. When fatigue sets in, she's got something useful to think about as an alternative to physical discomfort over the last half of a race. In addition, technical points are process goals that can help keep us together late in a race.

Concerns:
A potential concern is that X's narrow attentional strength may come at the expense of her broad external focus. X prefers to focus on keeping her own house in order and her current race plans emphasize this. Specifically, she will rotate through a different technical point every ten strokes or so. This may occupy enough of her attention internally that little is left to focus on what's happening outside her boat. If this is the case, here are several suggestions.

Possible Action:
First, X might benefit from focusing on a single technical point for more than ten strokes before changing. Increasing the number of strokes from ten to fifteen gives her less to stay on top of technically and more freedom to focus outside the boat. This change will not result in erosion of her technique. X has got a lot of training behind her. Consequently, her body will perform as it's been trained without having to tell it what to do every ten strokes. So, the suggestion is to de-emphasize the narrow focus slightly in the interest of allowing the broad external focus to develop.

Second, X might benefit from limiting the number of technical points she focuses on. If she decides to do this, developing technical priorities would help here. She might, for instance, decide that technical points 1-3 are fundamental to her rowing while technical points 4-6 are less important. Once these priorities are established, X would rotate through points 1-3 only and trust that the less important things will naturally follow. In short, X is focusing on the most important technical considerations rather than all the technical considerations she could be focusing on. The bottom line is that, again, she's concentrating on less narrow information so there's more room to focus elsewhere (e.g. outside the boat).

Lastly, X may benefit from regular training races in which she must respond to various race plans. Before these mock races, she might want to induce competitive emotion. Unlike her narrow and broad internal areas which improve with high competitive arousal, X's broad external focus remains limited under these conditions. Consequently, she may want to develop this focus in a competitive atmosphere. To induce competitive emotion, she would visualize everything about big competitions that make those events remarkable

or important to her. It could be the venue, personal rivalries, the investment she feels in herself, her teammates and her coaches, the consequences of being successful or unsuccessful in a heat and how this sets her up for the final etc. Once competitive emotion is induced, she competes in the training race. Her tendency will be to rely heavily on the narrow attentional area she's most comfortable with. Her goal in these training races is to develop more reliance on the broad external attentional area and respond to changing race conditions. Once actual competition takes place, she is confident in her ability to access and act on this outside information when necessary.

Personality Scales:
X's need for control scale (CON) is at the 84th percentile. This suggests that she likes to be in control (a good quality in a singles rower), but relinquishes enough of it that she's coachable. Her self-esteem for rowing is relatively low for someone with her history of success (SES=40th percentile). Chances are that self-esteem is moderated by her broad internal and broad external scores that are below the 50th percentile as well. As these areas develop, rowing-specific self-esteem should also.

X describes herself as more introverted (84th percentile) than extroverted (55th percentile). These scores indicate that X probably prefers to prepare in an environment that allows her some quiet time. She likely prefers a roommate on the road with extroversion/introversion scores like her own.

Finally, X's intellectual expression (IEX) is that the 84th percentile. This score suggests that she is comfortable offering advice to herself and perhaps to others. Her profile indicates that most of this feedback is critical or negative (NAE=84th percentile) rather than positive (PAE=5th percentile). However, it could simply be that X takes ownership over her own preparation (a good thing) and engages in a lot of self-correction. This would show up on the negative scale.

NOTE:
An interesting exercise in a mutually dependent team sport like rowing is to do an "overlay" of the athletes involved. Let's say we're looking at a competitive pair or double. The overlay involves comparing TAIS profiles for both rowers to determine the strengths and limitations of the boat. This information has implications for both training and seat selection. If, for instance, rower 1 has a stronger broad external focus than rower 2, then perhaps rower 1 should be in bow seat calling the race.

Elite Volleyball Player-Middle Blocker
X describes his attentional strength as an ability to narrow his focus (99th percentile). This indicates that he takes in relevant information about the individual across the net from him. When attacking, he likely sees the position of the blocker opposite him, the position of the blockers hands and attacks accordingly. When blocking, he likely takes in information re: tendencies, path of approach, upper body rotation etc. and blocks accordingly. X also reports an attentional strength in the broad external area (87th percentile). Broad external focus is about scanning the opposition, knowing their priority plays in each rotation and who they like to set the ball to. For example, X may recognize

that the opponent likes to run an X as their priority play in a certain rotation. Furthermore, they like to set the second man who's their best hitter. This is broad external information about the other team. X is good here.

The attentional area X has room for improvement in is broad internal (25th percentile). Broad internal is about what X himself decides to do with all this information about the other team. An example. The opponent likes to run an X in a certain rotation and set the second man. So far, this is all broad external information (about them). Now, X has to decide how best to respond to the situation. So, he may rehearse hearing the X call, then reading and reacting. He waits, tries to get hands on the quick set if it's made, but his main responsibility is to be penetrated on the second man. Of all the responses available to X in this situation, he has decided that this is his best option. X's broad internal (problem solving) focus should improve significantly as he prioritizes plays and hitters by rotation, decides what his responses will be, then spends time mentally rehearsing this pairing. This should be done early in his prep week so everything is locked in come game time.

X reports that all three attentional areas are at least as strong in big games than they are in games that are "less important". This is a player who becomes more focused and effective in key competition. If this is the case, X may benefit from inducing big game emotion before every match he plays (not just the big ones). To do this, he would simply rehearse those things about playoffs, nationals and so forth that make those competitions remarkable to him. The crowd, the consequences of winning or losing, pressure to play well for teammates and coaches, national team personnel in the stands etc. The goal is to increase our competitive arousal as much as possible, then go through our pre-game prep under those conditions.

X's information processing capacity has room for improvement. This score is at the 50th percentile and probably reflects the broad internal limitations he has described. As X's broad internal skills go up, his information processing should also and the decisions he makes should be good ones. While X is confident in his general decision making ability (90th percentile), his information processing is lagging. A reason for this situation may be as follows. Since he is strong in the broad external area, he takes in a ton of information about the other team. Since his broad internal area is weaker, however, the number of decisions he has to make might overwhelm him on occasion. A possible remedy might be to create hierarchies in terms of the important plays they run in each rotation. Instead of concentrating on all five of the plays they might run, X would concentrate on the two that they run most effectively and often. Now, he has to decide on appropriate responses to only two plays rather than five. It simplifies things. Multiply this by six rotations and there are twelve options to prepare for rather than thirty. If X's strategies can derail plays 1 and 2 in each rotation, they are forced to go with plays 3-5 and this is positive.

X's need for control and self-esteem scores both indicate an athlete who is coachable and will listen to suggestion. His volleyball-specific self-esteem seems tied closely to his information processing. It should go up as his broad internal problem solving improves.

X describes himself as more introverted than extroverted. He probably prepares better in an environment that allows him his quiet time.

His intellectual expression score is at the 16th percentile, indicating that he will not offer that much advice to others during games. This may go up as his broad internal scores improve and he feels confident that he has answers. The emotion he shows in competition is probably more negative (84th percentile) than positive (16th percentile). Given his introversion score, most of this negative emotion may be directed at himself rather than teammates or coaches. In other words, he may sometimes be self-critical or hard on himself.

Elite Synchronized Swimmer

X describes her broad external focus as her attentional strength. Her broad external score is at the 90th percentile. This attentional area involves an ability to take in information from a wide field of view. In a team event, X is likely to take in a lot of good information from the teammates she swims with. She is aware of her group and probably responds well to what they are doing. If something unpredictable or spontaneous happens within the group during competition, X will probably keep her head on and make the adjustment. This attentional focus is just as strong in very important competition as it is in less important competition (see OET or overload external score). In summary, this area has little room to improve and should be left alone.

X's narrow focus is also an attentional strength (80th percentile or so). This area involves the rhythm and quality of X's personal moves during competition. So, this is entirely about her own performance. Her score would indicate that she feels very comfortable about her own technical game. She is probably confident about this area before competition and carries that into her actual performance. Her RED or reduced focus score (50th percentile) indicates that her confidence in this area remains high in very important competition. X might spend a little time identifying important technical points that will allow her to complete difficult parts of her routine. If she needs to be high in the water, she might identify the technical point that best allows her to do this. Then, she mentally rehearses it. Overall, however, this area is strong and doesn't need much work.

X's lowest attentional score is her broad internal score (50th percentile). This attentional focus has to do with the order or sequence of the routines she does. Her score indicates that, before competition, she may not always feel that she's on top of the order of her routines. This uncertainty can sometimes produce pre-competitive anxiety that can get in the way of fluid completion of a program. X may benefit from mentally rehearsing her routines with the goal of having them locked in a week before competition. This way, she knows it's there well in advance and this produces pre-competitive confidence where doubt might have been there before. X should direct her rehearsal toward parts of her routine that need the most help. She shouldn't spend much time on those parts of her routine she can click through easily. In the end, she's concentrating on areas that can be improved rather than all areas of her routines.

All X's attentional areas are at least as strong under conditions of high competitive arousal. If she can improve the broad internal area, all three sources of information will be strong and accessible in big competition.

Currently, X's information processing is at the 84th percentile. It is probably limited only by the broad internal area. X processes a lot of information. Her decision making, however, is lower than her information processing score (65th percentile). This indicates that she may be taking in enough information that her decision making is difficult. Consequently, X may benefit from developing hierarchies to focus on. In the narrow area, she may concentrate only on those important technical points that, if done well, will allow her to perform her difficult moves well. In other words, she won't concentrate on everything, just the important stuff. In the broad internal area, she concentrates only on those sequences that need help, not the ones that are locked in. Concentrating on less (priorities only) and trusting her body to do the rest will generally result in smoother programs.

X's need for control (88th percentile) and self-esteem (75th percentile) suggest that she is coachable and realizes that a lot of helpful advice can come from others. If these scores were any higher, there might be cause for concern. A characteristic of high need for control/high self-esteem athletes is that they like to run their own show and know they're good. Consequently, they're sometimes difficult to coach. This is probably not a concern with X.

She is extroverted (84th percentile) in comparison to introverted (16th percentile). She is likely to prepare more effectively in a pre-competitive atmosphere that is animated and lively. She will probably be more comfortable with an extroverted rather than an introverted roommate on the road.

Lastly, X's intellectual expression score is at the 35-40th percentile. This suggests that she is unlikely to offer that much advice to herself or others. This score is in line with her broad internal score indicating that she may volunteer more advice once she has a better handle on this area. X is more prone to positive reinforcement of others than negative. This is good. This also means that she probably gives herself some praise as well