10th Annual Congress of the US Figure Skating Sports Medicine Society

“Applying Sports Science to Optimize Health and Performance in Figure Skating”

Saturday, January 15th, 2005
Hilton Portland Hotel
Agenda

6:30am- 7:15am  Registration / View Posters / Authors present

7:00am- 7:05am  Welcome
Dr. Christine Lawless, Chicago IL, VP of US Figure Skating
Sports Medicine Society and Program Chair

7:05am-7:15am  Dr. George Shybut, Cincinnati OH
Chair of US Figure Skating Sports Medicine Committee
“Future Directions in US Figure Skating Sports Medicine”

7:15am- 7:30am  Lisa Ralston-Mizer PT, Englewood CO
“New Technology and Research of Custom Orthotics”

7:30am-7:45am  Dr. Linda Haack- Rogers, San Diego CA
“The need for Training Notebooks: Developing a
Mental Training Program “

7:45am- 8:00am  Guest Speaker: Barbara Roles-Williams, World and
Olympic Coach, Newark DE
“What coaches and skaters need from figure skating
sports medicine and sports science”

8:00am-8:45am  Keynote address: Dr. William A. Sands, Head - Sport
Biomechanics and Engineering, Coaching and Sport
Sciences, U.S. Olympic Training Center, Colorado Springs
CO
“Applied Sports Science: Translating Data into
Performance “

8:45am-9:00am  Break, view posters, Authors available at posters, All
election ballots must be in at registration desk by 9:00am

9:00am-9:50am  Results of High Performance Evaluations
US Figure Skating High Performance Evaluation Faculty:
Dr. Roger Kruse, Toledo OH
Linda Tremain PT ATC, Downers Grove IL
Todd Baden MS CSCS, Toledo OH
Dr. Michelle Provost-Craig, Newark DE

9:50am-10:00am  Special address:
Val Belmonte, Colorado Springs, CO
Executive Director- US Figure Skating

10:00am-10:15am  Dr. Christine Lawless, Chicago IL
“Team Physician Pre-Competition Phone Call Is a Valuable
Preventative Strategy In World Team Skaters”
Announcement of results of Society Elections

10:15am-10:30am  Dr. Wendy Buchi, San Diego, CA
“A Summary of Injuries and a Model For Medical Care
During National Synchronized Team Skating Competition”

10:30am  Adjourn for Senior Men’s Final
**Posters**

Posters will be on display from 10:00 PM on Friday January 14th through 11:00 AM on Saturday January 15th in Galleria 1, 2, and 3 at the Portland Hilton. Authors will be present from 6:30am till 7:15am, and from 8:45 till 9:00am on Saturday January 15th.

1) **ANALYZING TECHNIQUE OF FIGURE SKATERS USING THE DARTFISH PROGRAM**  
Karen Tornquist, Skating Coach, Overland Park KS

2) **BEST ADULT INTERACTION STYLES FOR ENABLING TEEN ATHLETE PERFORMANCE**  
Richard D. Skeirik, MS, GCSP Kennett Square, PA

3) **A READINESS PYRAMID FOR ACHIEVING PEAK PERFORMANCE**  
Richard D. Skeirik, MS, GCSP Kennett Square, PA

4) **PILATES TRAINING FOR SKATERS IN CONJUNCTION WITH PSYCHOLOGICAL SKILLS TRAINING**  
Dr. Lori Head and Dr. Karen Appleby, Pocatello, Idaho

5) **BRACHIAL ARTERY TRANSECTION IN A SYCHRONIZED TEAM SKATER**  
Dr. Wendy Buchi, San Diego, CA

6) **ADULT SKATING: THE POSSIBILITIES ARE ENDLESS!**  
Dr. Cynthia M. Ferrara, Lowell, MA

7) **ANALYSIS OF BODY COMPOSITION OF SKATERS USING AIR DISPLACEMENT PLETHYSMOGRAPHY (BOD POD):**  
Michael Boggs, BS, MBA, Portland OR
Excessive pronation and internal rotation of the leg, along with anterior pelvic tilt, are common faulty biomechanics that often lead to injuries in our skaters. The purpose of this presentation is to share new technology in custom orthotics and research from Georgia State looking at the effects of corrective orthotics on plantar pressure.

“The purpose of this study was to examine the effects of different custom-molded semi-rigid orthotics on plantar pressure measures, comparing the Polypro by PAL Health Technologies (established and traditional lab) and Sole Supports (new total contact orthotics). These new orthotics are showing weight shift medially, by 36% in the midfoot and the hallux by 2% (under the 1st ray) (p<.05). “In contrast, the PolyPro orthotic significantly increased plantar pressure by 14% in the lateral forefoot and 23% in the lateral toes (p<.05)”

Weight shift over the hallux is “ideal” for functioning of the foot to push off or propel with walking, running, or jumping. The “total contact” custom orthotic seems to provide more effective and proper biomechanical correction according to the authors.

Orthotics is one component of effective biomechanical control. Just as important, is correct biomechanics through proper alignment training with development of core and hip muscles that control excessive femoral internal rotation and pronation. Developing control of these muscles is essential for good biomechanics during jumping and for injury prevention.

Lisa Ralston-Mizer, PT
Select one:

____X_____Original Research Presentation or Brief Lecture

____________Case Presentation

TITLE "The need for Training Notebooks: Developing a Mental Training Program"

AUTHORS: Linda Haack-Rogers, Ph.D.

ADDRESS: 16776 Bernardo Center Drive, Suite 110-C
San Diego, CA 92128

PHONE: 858-451-0771

EMAIL: Drlinda@agrowingchild.com

ABSTRACT (limit text to 500 words):

The presentation will review the basic importance of a mental training program that will compliment a skater’s physical training program. Review of basic skills, such as, visualization (mental rehearsal), goal development, development and utilization of mental cues, Training notebooks are kept by skaters to hold both their physical training needs and their mental training needs. Other items such as nutrition & diet, travel, media, various articles are also held within the skaters’ Training notebook. Assessment tools will be presented and explained. Goal sheets, Daily Log, Competition Evaluations, and Energy Level (Arousal Assessment) will be presented and explained. Skaters and coaches need to understand the basic components and assessment tools of a mental training program to help monitor progress and identify problem areas. Each athlete has a unique view on their sport, how they learn, how they practice and how best they perform. Training Notebooks help develop individual programs that meet the need of individual athletes.

Outline of Table of Contents for Workbooks are as follows:
Sections within the Workbook

**Mental**
- Training: Goals & Activities
- Imagery Practice
- Competition: Goals & Activities
- Imagery Practice

**Physical**
- Training: Goals in Skating
- Competitions: Goals in Skating
- Supportive Activities: Off-Ice, Ballet, Pilates, etc
- Nutritional Needs & Weight
- Sleep
- Traveling Issues & Needs

**Daily Diary of Practice Sessions**

**Assessment Tools**
- Pre & Post Competition Evaluations

**Articles**
- Media and Competition Travel
- Sport Camps

A brief discussion at the end will identify trouble-shooting and resources. An overhead/PowerPoint presentation will be seen for Goals, Daily Diary, Energy Levels, and Pre-Post Competition Assessment. Handouts will also be given.

Dr. Linda Haack-Rogers is a licensed psychologist with a Ph.D. in Clinical Psychology, Sport Psychology specialty. Her dissertation research included 350 athletes entitled “The Athletes Reaction to Competition Scale Fear of Failure and Fear of Success.” Dr. Haack-Rogers was both a USFSA competitive individual and pair skater training under John A.W. Nicks in Southern California. She has coached both ISIA and USFSA skaters while attending college and graduate school. Dr. Haack-Rogers’ has been licensed as a psychologist since 1991. She has worked with numerous amateur and professional athletes since 1987 nationally and internationally. She has conducted workshops for athletes, coaches and parents at National competitions, coaches conventions, Making of a Champion (workshops in conjunction with USFSA World Champion, Randy Gardner), Olympic Training camps for Rhythmic Gymnastics and most recently presented at the PSA Convention in San Diego, May 2004. Dr. Haack-Rogers currently has a private practice in San Diego, California. You may also hear her every Sunday morning in San Diego on the radio, AM 600, “KOGO for Kids.”
TITLE:
TEAM PHYSICIAN PRE-COMPETITION PHONE CALL CAN BE A
VALUABLE PREVENTATIVE STRATEGY IN IDENTIFYING AND TREATING
MEDICAL ISSUES IN WORLD TEAM SKATERS

AUTHORS: Christine E. Lawless MD
ADDRESS: Sports Medicine and Cardiology
DuPage Medical Group
25 North Winfield Rd
Winfield IL 60190

PHONE: 630-784-2115 EMAIL: christine.lawless@dupagemd.com

Abstract:
Introduction: In organized high school and college sports, team physicians identify and treat medical issues early, thereby minimizing significant impact on athlete performance. In contrast, in the highly-individualized sport of figure skating, athletes are unlikely to have the benefit of an on-going relationship with a local team physician. There is excellent existing medical supervision at the national level, but it can be difficult to maintain current information on athletes.

Current system of medical care for US skaters: Locally, skaters are treated by their primary physicians, but generally only when problems occur. High-level US figure skaters undergo comprehensive evaluation once a year by the high-performance team, and significant performance issues are addressed and identified. Thus, most interactions between any physician and the figure skating athlete occurs either locally at the time of acute injury or illness, once a year at high-performance evaluation, or when there is an identifiable medical issue during travel.

Purpose: The purpose of this brief report is to demonstrate how a simple phone call two weeks before international competition can identify significant medical issues in our skaters that were previously unidentified by the above system. By addressing issues prior to leaving, effects on performance can be minimized.

Methods: Two weeks prior to a major international event, the assigned team physician phoned 13 US Figure Skating team athletes to inquire whether they were suffering from any injury or medical ailment unknown to the team physician. Athletes were specifically asked about:
symptoms of exercise-induced-bronchospasm (EIB), active infections, underlying medical conditions, and the musculoskeletal system. Results were compared to what was available in the registry.

**Results: (N= 13 skaters)**

<table>
<thead>
<tr>
<th></th>
<th>EIB</th>
<th>Infections</th>
<th>Underlying medical issue</th>
<th>Musculoskeletal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Previously known or reported in registry</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>New or never reported diagnosis</td>
<td>1</td>
<td>2</td>
<td></td>
<td>2</td>
</tr>
<tr>
<td>Already receiving ongoing therapy</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Required newly prescribed diagnostic tests, treatment or rehabilitation</td>
<td>1</td>
<td>2</td>
<td></td>
<td>2</td>
</tr>
</tbody>
</table>

Of 13 elite international singles, pairs, and dance athletes, 5/13 (38.5%) reported new issues that were previously not detected or reported. Two out of 13 (15.3%) required administration of physical therapy prior to leaving on the trip, and 3/13 (23%) required medical evaluation or treatment with medications prior to leaving. Specific conditions included acute ankle sprain (athlete had not sought medical care locally), anterior knee pain, influenza, upper respiratory infection, and new-onset of EIB. All 5 newly identified conditions were treated prior to departure. Fortunately, the athlete with EIB had been tested 1.5 years prior by the high-performance team. Results were positive. The athlete was not symptomatic at the time, so therapy had not been initiated. But, test results were used to emergently complete all the necessary therapeutic use exemption (TUE) paperwork for use of albuterol prior to team departure.

**Conclusion:** Although a very simple concept, a simple phone call by the team doctor two weeks prior to an international event can identify previously unidentified medical issues which require intervention in up to 38.5% of skating athletes. This technique can easily be translated to other skating settings to minimize adverse effects on performance. Our report also demonstrates the benefit of figure skating team physicians interacting with the figure skating medical registry, and the high-performance team. Previous test results proved valuable in making a rapid diagnosis, thus maximizing the efficiency of the system in athlete medical evaluations. The pre-event phone call is highly recommended!

Dr. Christine Lawless is board certified in cardiology with a certificate of added qualification (CAQ) in Sports Medicine, and an MBA from the University of Notre Dame. Dr. Lawless serves as team physician for the US Figure Skating (USFS) world teams, and in this role she has traveled to Helsinki, Finland for the 2004 World Junior Grand Prix Final and to Milan, Italy for
the 2004 World Junior Synchronized Skating Championships. She is a member of the USFS Sports Medicine Committee, and serves as vice-president of the USFS Sports Medicine Society.
ABSTRACT:
INTRODUCTION: The 2004 U.S. National Synchronized Team Skating Championships included 2500 skaters, ages eight to eighty, skating at three venues over five days. Little was known about the type of care required in previous years, or how to best serve the medical needs of the competition. METHODS: The host club set up a model that included the following: 1) All competition skating was staffed by a volunteer physician at rink-side, and a staffed ambulance at the Zamboni ramp. 2) All official and unofficial practice ice was staffed by a physician, nurse, nurse practitioner, physician’s assistant, physical therapist, or trainer. First Aid kits were made specifically with the needs of synchronized skaters in mind, and were placed at the staffed rink-side tables. Copies of directions to the nearest appropriate hospital were available. The hospital had previously been alerted to the possible needs of the competition. Log books were provided at each station to record the types of injuries.
RESULTS: A total of 50 injuries were recorded. Of these, one was life-threatening (brachial artery transection) and occurred during practice. Other injuries included lacerations (20%), half of which required sutures, abrasions (10%), knee strain (10%), asthma (8%), ankle strain (8%), requests for ibuprofen (8%), and nausea (6%). The remaining 30% of encounters included migraines, anxiety, blisters, pleuritic chest pain, finger fracture, shoulder strain, wrist pain, hip pain, and calf muscle pain.
CONCLUSIONS: 1) This first aid model provided appropriate medical care to meet the needs of a large synchronized skating competition. 2) A large number of volunteer medical providers were needed, and may be difficult to obtain at some venues. 3) The actual total number of injuries was unknown as several teams traveled with a trainer or physician, who may have met the needs of their team. 4) Life threatening injuries are possible in high level synchronized skating and must be anticipated.
Select one:

X_____Original Research Presentation or Brief Lecture
__________Case Presentation

TITLE: Analyzing Technique of Figure Skaters using the Dartfish Program: Access to this program can bring scientific information to coaches and skaters and aid in the development of a skater’s performance.

AUTHORS: Karen Tornquist

ADDRESS: 12456 Craig Street
Overland Park, KS 66213

PHONE: (913) 908-0567

EMAIL: KARENTORNQUIST@MSN.COM

ABSTRACT (limit text to 500 words):
The study of figure skating is becoming more of a science than just artistry and jumps on ice. Coaches continue to educate themselves through the Professional Skaters Association, US Figure Skating, as well as furthering their knowledge in college offered courses in areas of Biomechanics, Kinesiology, Physics and other human performance studies. Sport Specific proven scientific information in the area of figure skating is highly needed and needs to be applied to figure skating in a manner that is understandable for ages as young as five through 25 years old and older.

The coach training the skater used to rely on what their own eyes saw in less than a second when analyzing a skating jump. “Jump higher” the coach would say. “How much?” the skater wondered. “Pull in faster and tighter”, says the coach. The student would respond “I am!” as he or she tries. “Skate faster into the jump so you can jump higher and rotate faster”, but how fast? “Bend your knees more to jump higher” but how much? “Why can’t I land this jump? I am doing everything my coach tells me. I must be a terrible skater,” may think the student. It is the
skater who needs to know how to become a better skater through the training expertise of the coach.

The Dartfish program is a computer program that can aid in discovering these answers to technical questions. The coach and student by the side of the rink can immediately analyze on computer through captured clips a jump up to \(\frac{1}{100}\)th of a second at a time to review body positions and angles, jump height, spin rate, air duration from take off to landing as well as compare the unlanded jump to a landed jump simultaneously. The computer program allows the skater to see for him or herself the technical errors and corrections that were made in their performance. The coach can give feedback on a Dartfish produced CD that contains various clips of jumps from the skaters lesson and provide technical corrections via drawings, stromotion, simultaneous comparisons, measurements, verbal and written commentary. The student can review this information on their own computer at their leisure as many times as they wish. Learning visually can be easier for some students than words alone.

Thus far, use of the Dartfish program is not highly used in skating facilities at this time. Partly the reason may be that the software package is over $4000 and a good many hours that turn into weeks are necessary in learning the program. It is my intention through the submitting of an abstract for a brief lecture and Dartfish Demonstration presentation is to show the value of this software program and how through possible future scientific case studies, access to this program can bring scientific information to coaches and skaters and aid in the development of a skater’s performance.
ABSTRACT: A survey of the sports psychology research suggests that parents and coaches can best support teen athlete performance by interacting with them in five modes. First, they should try to develop a task orientation in the athlete by emphasizing accomplishment of new skills, putting forth strong effort, and measuring performance against internal criteria. Secondly, when desired results are not achieved, adults should avoid negative judgment or criticism and instead emphasize the effort put forth. Third, adults should avoid criticism or socially embarrassing behavior with athletes in public, especially around competition. Fourth, in skill learning, the best response to a correct execution is praise combined with information. Fifth, errors in skill learning, especially for teen girls, are best handled with a simple instruction to "try again," or if necessary, with a nonjudgmental technique correction.

While failure in execution and failure in competition are inherent parts of high-level athletic activity, a common thread through all of these interaction styles is a matter-of-fact acceptance of failure combined with a positive focus on learning and effort. Teen girls are especially sensitive and perceive even the mention of error as criticism.

*Richard Skeirik is an adult freestyle skater with 11 years training experience and four Adult Nationals competitions; a Basic Accredited PSA Member; holds an MS in Chemical Engineering and just completed a Graduate Certificate (2004) in Sport Psychology. He has 22 years experience in computers and control systems for DuPont Engineering and is inventor on 17 US Patents. He is author and publisher of two books, one on abusive relationships and one on corporate diversity. His newly established firm, Sport Smarts, offers mental skills coaching to athletes and coaches.
ABSTRACT:

MENTAL ENERGY
Practice Fatigue
Life Habits Exhaustion

MENTAL FOCUS
Distraction
Life Concerns

MENTAL AWARENESS
Misunderstanding Instructions
Forgetting Instructions

KINESTHETIC AWARENESS
Kinesthetic Misperception

KINESTHETIC MEMORY
Incomplete Muscle Memory

PHYSICAL ENERGY
Practice Fatigue
Life Habits Exhaustion
A performance readiness pyramid for complex motor skills, building up from physical readiness through mental readiness and kinesthetic readiness to a peak of optimal performance, can help coaches and athletes identify the root cause of performance errors. When an athlete fails executing a high-level skill, at least one error or gap in readiness is the cause. The readiness error lowest in the pyramid is primary and must be corrected before addressing a readiness error higher in the pyramid.

Readiness errors can result from short or long-term causes. Corrections to short-term errors are typical of classical coaching styles. Longer-term sources of error, which include life habits problems and life concerns, can also undermine readiness and call for longer-term corrections. Lifestyle adjustment, counseling, and mental skills training may be needed to address these concerns. When longer-term readiness problems are at the root of performance failures, coaching that focuses primarily on skill instruction may not be successful.

Several insights into training practices come from this. First, the hierarchy shows that life habits and life concerns need to be addressed before an athlete can be effectively trained in complex athletic skills. Second, many athletes will need mental skills training to deal with distraction and life concerns before they can achieve high-level performance. Third, the undermining effect of practice fatigue -- both mental and physical -- needs to be constantly in mind. Last, a single-minded focus on skill instruction may be counterproductive when more fundamental deficiencies in readiness are the root cause of performance errors.

*Richard Skeirik is an adult freestyle skater with 11 years training experience and four Adult Nationals competitions; a Basic Accredited PSA Member; holds an MS in Chemical Engineering and just completed a Graduate Certificate (2004) in Sport Psychology. He has 22 years experience in computers and control systems for DuPont Engineering and is inventor on 17 US Patents. He is author and publisher of two books, one on abusive relationships and one on corporate diversity. His newly established firm, Sport Smarts, offers mental skills coaching to athletes and coaches.*
PILATES TRAINING FOR SKATERS IN CONJUNCTION WITH PSYCHOLOGICAL SKILLS TRAINING

Dr. Lori Head and Dr. Karen Appleby, Pocatello, Idaho

Knowledge of both strength training and conditioning and mental skills are an important part of an athlete’s preparation for sport. In the brief time allotted for a case presentation, I will be discussing the advantages of the pilates technique for a figure skater’s training regimes. The pilates method is based on core strengthening the body, while utilizing the right and left movement equally. Pilates lengthens one muscle group while strengthening another.

As an accomplished skater, dancer, and physical educator I am a firm believer in the pilates method. I have been a pilates instructor for 14 years and now am the only person in Idaho to certify pilates instructors. Because of my history I have worked with many athletes, healthy and injured and have witnessed the power of pilates.

Pilates if based off a solid foundation of floor work and the equipment consisting of a reformer, wunda chair, and cadillac. The spring resistance on the equipment can accommodate all levels of athletes, body types, skill levels, postural discrepancies, and flexibility and strength issues. Pilates also offers endless choice of exercised and multidimensional training.

Ice skaters will always have the ice and their skates as a dominant factor in the sport of skating. The well-rounded skater will add pilates to their training program.

With consistent practice psychological skills training (PST) is an effective way to enhance athletic performance (Weinberg & Gould, 2003). PST is a broad term for various activities athletes can engage in to increase confidence, motivation, and self esteem and also help athletes regulate stress and arousal. While PST alone cannot increase performance, research has suggested that utilizing and practicing PST in conjunction with appropriate physical training can increase competitive performance for athletes of all abilities (Greenspan & Feltz, 1989; Weinberg & Comar, 1994). In this presentation, I will provide a brief definition of PST, identify barriers that limit athletes’ use of PST, and introduce one approach to PST called goal setting. While goal setting is a common technique used among athletes and coaches, the specifics related to setting appropriate goals to enhance motivation and provide direction for personal achievement are often not identified (Weinberg & Gould, 2003). In this presentation I will provide a guideline for effective goal setting for figure skaters. This guideline will include the following components: (a) when to set goals, (b) setting appropriate goals, (c) developing strategies to achieve goals, (d) fostering goal commitment, and (e) evaluating goals.

References:
CASE PRESENTATION

TITLE: BRACHIAL ARTERY TRANSECTION IN A SYCHRONIZED TEAM SKATER

AUTHOR: Wendy Buchi, M.D.

ADDRESS: IGO Medical Group
9339 Genesee Avenue, Suite 220
San Diego, CA 92121

PHONE: (858) 792-9210
EMAIL: wbuchi@ucsd.edu

ABSTRACT:

INTRODUCTION: Superficial lacerations and puncture wounds are a common injury in figure skating, especially synchronized team skating, but deep lacerations are rare and have not been reported in the literature.

CASE PRESENTATION: While performing a back lunge pass-through during practice at the 2004 National Synchronized Team Skating Championships, a 13-year-old Junior skater suffered a 10 cm laceration on her left antecubital fossa. Direct pressure with a pressure dressing did not stop the bleeding, so pressure point bleeding control on the brachial artery was used. Paramedics arrived 25 minutes later and she was transported by ambulance to the hospital. Further evaluation in the emergency room and operating room revealed a complete transection of the brachial artery, laceration of the medial 1/3 of the median nerve, transection of the medial biceps tendon, and transection of the triceps muscle. The artery was repaired by a brachial artery bypass with a reversed left groin greater saphenous vein interposition. The nerve laceration was complex and the decision was made not to repair it acutely. She did not require a blood transfusion. She was discharged after four days to follow up near her home where her care is ongoing.

DISCUSSION: A review of the literature on vascular trauma in children reveals a low amputation rate. Most lacerations are repaired by primary closure, end-to-end anastomosis or vein grafts. The 13% intraoperative mortality rate is described, mostly due to hemorrhage. Disability is greater with lower arm injuries than with upper arm injuries and the long term prognosis is good. Brachial artery lacerations are potentially life-threatening injuries which require prompt management and intervention.

CONCLUSION: This is the first case report of brachial artery laceration in a figure skater and reemphasizes the need for those associated with figure skating to have knowledge of first aid. This complex upper arm laceration was successfully managed by rapid institution of basic first aid at the rink, followed by immediate transport to a trauma center, and prompt surgical intervention.
Figure skating is an increasingly popular sport in the United States, pursued by active people of all ages. In recent years, the number of adults (those 25 years and older) who enjoy skating as a recreational or competitive sport has increased significantly. Although young skaters face considerable obstacles in their competitive skating careers, adult skaters often face a different set of challenges to skate, train, and compete. Work, school, and family commitments often limit the amount of time that may be devoted to skating. The level of physical conditioning, flexibility, and overall health may further limit an older skater’s progress in the sport. In spite of these issues, many adults continue to learn and love to skate, participating as recreational and competitive skaters in many countries around the world.

Adults may now compete in local, regional, national, and international competitions. This past April, the tenth U.S. Adult Figure Skating Championships was held at the Olympic Arena in Lake Placid, NY, with more than 600 skaters competing. In May, the sixth Mountain Cup in Villard-de-Lans, France drew over 130 adult skaters from 12 countries, securing its place as the largest international adult competition.

In recent years, numerous programs have been developed specifically for adult skaters. Training camps are now available for adult skaters, including one sponsored by the U.S. Figure Skating Association, held this past year at The Ice House in Hackensack, NJ. These camps are for all adult skaters, from those who are just learning to skate to those who are preparing for competition. In addition, a free skating and dance workshop is now offered before the Mountain Cup international competition in France, with approximately 30 competitors per year attending since its inception in 1999. There is little information or research on adult skaters, their aerobic capacity, strength, flexibility, and other physiological characteristics that may contribute to their success on the ice. Expansion of programs available to adult skaters, both recreational and competitive, will be important in future years, not only to improve performance of the skaters in competition, but also to reduce the number of injuries and to examine the long-term health benefits of skating for all individuals.
ANALYSIS OF BODY COMPOSITION OF SKATERS USING AIR DISPLACEMENT PLETHYSMOGRAPHY (BOD POD):
Michael Boggs, BS, MBA, Portland OR