



# ISAKOS

newsletter

## SUMMER 2008

Volume 12, Issue 2

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## Join ISAKOS in Osaka...

Join ISAKOS in Osaka for an extraordinary exchange of knowledge at the 7<sup>th</sup> Biennial ISAKOS Congress. The 7<sup>th</sup> Biennial ISAKOS Congress will be held on April 5-9, 2009 in Osaka, Japan.

Osaka is a confident and stylish city, known for shopping, restaurants and nightlife. Home to almost nine million people, Osaka's economy exceeds that of nearby neighbors Hong Kong and Thailand. With more than 1400 years of history, Osaka has maintained a rich cultural heritage, while becoming a progressive and prosperous city.

Osaka offers many activities and local attractions for visitors, including the National Museum of Art, the Museum of Oriental Ceramics, Osaka Museum of History, Osaka Science Museum, Osaka Museum of Natural History, Osaka International Peace Center and the

National Bunraku Theatre. Other activities include the Osaka Aquarium Kaiykan, Tennoji Zoo, and Universal Studios Japan.

The 7<sup>th</sup> Biennial ISAKOS Congress will be held at the Osaka International Convention Center. Built in 2000, the Osaka International Convention Center has served as a gateway between Japan and the International Community. Located in the urban heart of Osaka, the Convention Center offers easy access to the city's sophisticated urban amenities.

ISAKOS members who have not attended a recent ISAKOS Congress are encouraged to attend in 2009 to experience the unique diversity and vibrancy inspired by the international exchange of knowledge offered at the ISAKOS Congress.



### Congress Highlights

- Integration Between EBM and Future Challenges
- The Future of Sports Medicine
- Double Bundle ACL Reconstruction: Any Clinical Evidence?
- Cartilage Repair: Present and Future
- Knee Arthroplasty: Unicondylar versus Total
- Minimally Invasive Arthroplasty
- Athletic Shoulder: Difficult Problems and Controversies
- Difficult Elbow Problems
- Advancement in Ankle and Hip Arthroscopy
- Difficult Knee Problems: PCL, Meniscal, and Patellofemoral
- Overuse: Evidence-based Overview

### Featured Sessions

- Scientific Paper Presentations
- Electronic Poster Exhibits with Best 20 E-posters
- Socratic Debates
- Surgical Demonstrations
- Instructional Course Lectures
- Partner Society Lectures
- Didactic Lectures
- Hands-on Workshops
- Technical Exhibits

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## Editor's Note

**James H. Lubowitz, MD (USA)**

### *Discovering Japan*

In the Spring 2007 ISAKOS *Newsletter*<sup>1</sup>, we reviewed that surgeons require “cultural competence”<sup>2</sup> to communicate effectively with individuals of backgrounds different from our own. In addition, as a result of our ISAKOS membership, we have a head start or “cultural confidence” because ISAKOS allows us to share in the company of an international society. Next, in our Winter 2008 issue we established that we need to travel to the ISAKOS Biannual Meeting in Osaka, Japan because we excitedly anticipate cutting edge research advances.<sup>3</sup>

Thus, since we will be discovering Japan, whether for our first visit or a return, and since we desire to maintain our confident levels of cultural competence, it is necessary for us to prepare by reviewing some basic rules of etiquette unique to our host country. As a source, we must therefore turn not to *Arthroscopy* journal but to the *Conde Nast Traveler*.<sup>4</sup>

First, to the table: at sushi, “You should order as quickly as possible and eat the sushi the minute it comes out; the chef will like to move things along. ‘Don't chat with your friends...Just eat, and then say “Yummy!”—something every chef likes to hear.’ There is no set sushi meal; rather, the chef will propose (and you should accept) the season's freshest offerings...Don't eat nigiri with chopsticks. ‘Sushi is finger food,’... Pick up the piece with your thumb toward the bottom and quickly flip it over. Dip it gently, fish side down, in the soy sauce. The rice should not make contact with the sauce. Pop it into your mouth and eat it in one bite (some argue that it's preferable for the fish to land on your tongue first). Add wasabi VERY sparingly, if at all—using it implies the chef hasn't properly seasoned his rice. And if the chef has used a more complicated sauce for the nigiri, using too much soy sauce would also insult him...Sashimi should be eaten with chopsticks. If you want to season it, place a small dot of wasabi in the middle, fold the fish in half over it, and then dip a corner of the fish into the soy sauce. Do not season to taste if the sashimi comes with its own sauce.” For miso soup, generally “you will not be given a spoon. Fish out the bits of food with your chopsticks and then drink the liquid in a few quick drafts...You should ALMOST NEVER blend soy sauce and wasabi. It destroys the root's potency and results in a muddle of flavors, which may be to your taste but is not the proper way to eat sushi...Ginger is used as a palate cleanser between pieces of fish, not as a sushi topping. Eat all the garnish as well; it's thought to aid digestion...Finally, if you enjoy beer or sake, do not pour either for yourself; pour for your companion and then he or she will do the same for you. Men hold the bottle with one hand when pouring; women use both hands...” Delicious!

Next for business: Many Japanese hosts offer handshakes to international guests. “Don't bow unless our hosts do so first”. There are many types of bows; friends generally offer “a quick dip of the head and shoulders”. Don't over do your bow—a dramatic waste bend is reserved for rare and special occasions, “and is considered disturbing or disingenuous when overused”. With regard to your business card, “It's very important that yours be crisp, clean, and presentable; you will be handing them out often. A card should be offered with both hands, and received with either your right hand or with both. Look at it long enough to convey that you're processing the presenter's name and rank and the importance of his or her title”.

As above, gender differences may also be important in Japan: “When bowing, women should hold their hands flat against the body, with fingers clasped. Men should hold their arms straight against their sides, palms against the legs”...Women “should serve and hold any drink—tea, sake, beer—with two hands (one supporting the bottom of the cup, the other holding it by the handle or around the middle). Men should not do this; it's considered effeminate...Don't wear heavy perfume to a sushi bar. Chefs think it disturbs the palate.”

Best of all, and a relief to me as the writer of this editorial, international guests in Japan are “not expected to conform to all the intricate rules of etiquette that Japanese schoolchildren know by heart”. We are guests, and in Japan, guests are treated very well. On the other hand, the effort to become culturally competent will be very much appreciated, so the more we know, the better!

*See you in Japan.*

**James H. Lubowitz, MD**

1 Lubowitz J. “Cultural confidence.” ISAKOS *Newsletter*—Spring 2007;2.

2 White AA, Hill JA, Mackel AM, Rowley DL, Rickards EP, Jenkins B. Symposium: The relevance of culturally competent care in orthopaedics to outcomes and health care disparities. *J Bone Joint Surg Am* 2007;89:1379-1384.

3 Lubowitz J. Cutting edge research advances anticipated in Osaka. ISAKOS *Newsletter*—Winter 2008;3.

4 Kachka B. Etiquette 101: Japan. *Conde Nast Traveler*—November 2007;200-204. <http://www.concierge.com/cntraveler/articles/detail?articleId=11495>



## President's Message Paolo Aglietti, MD (ITALY)

*Dear Friends,*

2008 has been a busy year for our Society. On the path of the successful 2007 ISAKOS Congress, and with more and new friends directly involved in our Society, many activities are being performed. These activities include those of the ISAKOS Program Committee, under the direction of Program Chairman Professor Kazunori Yasuda, and local Japanese friends preparing to welcome ISAKOS to Osaka in April 2009 for the 7th Biennial ISAKOS Congress.

ISAKOS is growing and is now a reference point for the medical community. Through our continuously updated website, ISAKOS members from all over the world have access to information to improve their daily practice, patients' satisfaction, and quality of healthcare provided. Online resources have proven to be a valuable method of exchanging information and experience, in order to improve the practice of medicine by all our members.

ISAKOS' mission has always been to spread our members' wealth of knowledge and experience everywhere, particularly to developing countries who have traditionally been less involved in the scientific community. More surgeons and professionals from growing countries are joining our society. On this purpose, strategic meetings are being performed in what were previously considered unusual venues. The recent cooperative "Surgical Skills and Hands-On Cadaver Workshop" held in Shanghai, China with the Chinese Society of Sports Medicine (CSSM) and the Arthroscopy Association of North America (AANA) is a successful example of this concept. Other courses are being held under ISAKOS patronage in South Korea, Argentina, Mexico and Egypt.

Through all these efforts, ISAKOS will continue to pursue our primary mission to improve the quality of healthcare and physicians' practice around the world.

**Paolo Aglietti, MD**

*ISAKOS President, 2007–2009*



## Join ISAKOS in Osaka...

# 7<sup>TH</sup> BIENNIAL ISAKOS CONGRESS

**OSAKA, JAPAN • APRIL 5–9, 2009**

# ISAKOS

# ISAKOS WELCOMES NEW MEMBERS

Stavros Alevrogiannis, MD, GREECE  
Hemerson Coelho Alves, MD,  
BRAZIL  
Hiroshi Amano, MD, JAPAN  
Hiroto Asagumo, MD, JAPAN  
Roger Badet, FRANCE  
Xizhuang Bai, MD, CHINA  
Philip Chapman-Sheath, MD,  
UNITED KINGDOM  
Gang Chen, MD, CHINA  
Weinan Chen, MD, CHINA  
Hainan Chen, MD, CHINA  
Shuxiang Chen, MD, CHINA  
Dong Cheng, MD, CHINA  
James Campbell Chow, MD, USA  
Robert Mario Da Silva, MD, USA  
Xuesong Dai, MD, CHINA  
QiRong Dong, MD, PhD, CHINA  
Bianca Farias de Carvalho Lopes  
Bastos, MD, BRAZIL  
Jan Grauzel, MD, SLOVAKIA  
Guiquan Han, MD, CHINA  
Riku Hayashi, MD, JAPAN  
Yaohua He, MD, CHINA  
Yong He, MD, CHINA  
Michael Tobias Hirschmann, MD,  
SWITZERLAND  
Hiroo Ikeda, MD, JAPAN  
Ho-Joong Jung, MD, KOREA  
Yifan Kang, MD, PhD, CHINA  
Yasuyuki Kawaguchi, MD, JAPAN  
Asim Kayaalp, MD, TURKEY  
Woei Shaw Khoo, MBBS, MS Orth,  
MALAYSIA  
Joyce Koh, MD, SINGAPORE  
Jan Kosmider, MD, POLAND  
Radoslaw Kukielka, MD, POLAND  
Weigao Lai, CHINA  
Zhong Zheng Li, MD, CHINA  
Matthew G. Liptak, BMBS,  
AUSTRALIA  
Kuo-Yang Liu, MD, TAIWAN  
Ning Liu, CHINA  
Haifeng Liu, CHINA  
Walter Richard Lowe, MD,  
Wei Lu, MD, PhD, CHINA  
Wei Lv, MD, CHINA  
ChunBong Benjamin Ma, MD, USA  
Peter Benjamin MacDonald, MR  
FRCS Dip Sport Med, CANADA  
Kenichi Mihara, MD, JAPAN  
Raffy Mirzayan, MD, USA  
Eiichi Nakamura, MD, PhD, JAPAN

Rafal Namyslak, MD, POLAND  
Yoshiki Otaka, MD, JAPAN  
Jun Pan, MD, CHINA  
Rahul Patel, MD FRCS (Tr&Orth),  
UNITED KINGDOM  
Venkata Shyam Prasad Polisetty,  
M.CH, INDIA  
Robert Pyczula, POLAND  
Yizhong Ren, MD, CHINA  
Tomoyuki Saito, MD, PhD, JAPAN  
Hiroya Sakai, MD, PhD, JAPAN  
Enrique Alberto Salas, VENEZUELA  
Hirotaka Sano, MD, JAPAN  
Werner Siekmann, MD, GERMANY  
Achmad Sjarwani, MD, PhD,  
INDONESIA  
Allston Stubs, MD, USA  
Orestes Rolando Suarez, MD, PERU  
Tomoyuki Suzuki, MD, JAPAN  
Xueren Teng, MD, CHINA  
Vytautas Tutkus, MD, LITHUANIA  
Ender Ugutmen, MD, TURKEY  
Werner van der Merwe, MD, SOUTH  
AFRICA  
Daping Wang, CHINA  
Yubin Wang, MD, PhD, CHINA  
Dong Wang, MD, CHINA  
Min Wang, MD, CHINA  
Zimin Wang, CHINA  
Hongzhen Wang, PhD, CHINA  
Lei Wang, MD, CHINA  
Weiming Wang, MD, PhD, CHINA  
You Wang, MD, PhD, CHINA  
Qingjun Wei, PhD, CHINA  
Hongtu Wei, MD, CHINA  
Qing Xia, MD, CHINA  
Youjia Xu, MD, CHINA  
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Guang Yang, CHINA  
Chee Khuen Yong, MB,BS, MS  
Ortho, MALAYSIA  
Debo Yue, MD, CHINA  
Weitao Zhai, MD, CHINA  
Yuming Zhang, MD, CHINA  
Chuanjun Zhang, MD, CHINA  
Yijun Zhang, MD, CHINA  
Qichun Zhao, MD, CHINA  
Lun Zhou, MP, CHINA  
Ke Zhou, CHINA  
Xiaobo Zhou, MD, CHINA  
Rangteng Zhu, Master, CHINA  
Meng Yong Zhu, MD, CHINA



## ISAKOS Mission Statement

*ISAKOS advances the worldwide exchange and dissemination of education, research and patient care in arthroscopy, knee surgery and orthopaedic sports medicine.*

[www.isakos.com](http://www.isakos.com)

## ISAKOS OFFICE UPDATE:

The ISAKOS Office has been hard at work with the planning of the 7<sup>th</sup> Biennial ISAKOS Congress. The Congress website is now available by visiting [www.isakos.com](http://www.isakos.com). The Congress website includes information related to Registration, Scientific Program, Social Programs, Spouse Program and Tours, Information about Osaka and the surrounding areas, and more. Please also make sure to visit the Frequently Asked Questions page, for answers to the most common questions related to the Congress.

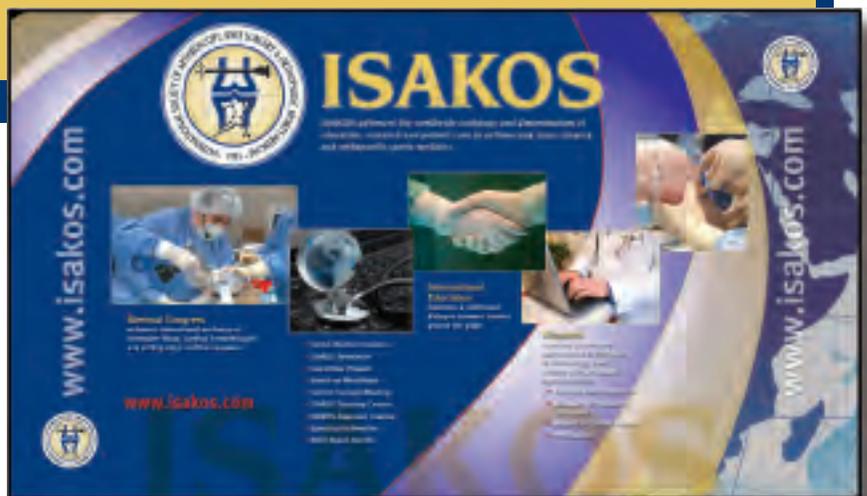
The Congress Exhibitor Prospectus and Sponsorship Brochure is also available on the website. If you have any company contacts you feel would benefit from exhibiting at the Congress, please contact the ISAKOS Office ([exhibits@isakos.com](mailto:exhibits@isakos.com)) and we will send information.

The **Preliminary Program** is in the final stages of development. Please watch your mail box in August of 2008. More information related to the ISAKOS Congress can be found on page 6 of this Newsletter.

**Save \$25 by registering online** – Registration for the ISAKOS Congress will be available online via the ISAKOS website on August 1, 2008! Please refer to ISAKOS Congress Frequently Asked Questions on page 7 of the Newsletter.

**Membership Applications Available Online** – ISAKOS Members can still win a free ISAKOS Congress registration by referring new members to the online ISAKOS Membership Application. One entry per application received; no limit to the number of entries.

ISAKOS has a new marketing booth – The booth debuted at the recent ESSKA Congress, held in Porto, Portugal in May of 2008. Please look for the ISAKOS Booth at future events including the AOSSM Annual Meeting in Orlando, Florida in July.



# 7<sup>TH</sup> BIENNIAL ISAKOS CONGRESS

OSAKA, JAPAN  
APRIL 5–9, 2009

## CONGRESS INFORMATION

### UPDATE FROM THE ISAKOS PROGRAM COMMITTEE

The ISAKOS Program Committee, under the guidance of Program Chair Kazunori Yasuda, and Co-Chair Andreas Imhoff, are hard at work developing another fantastic scientific program for the 2009 ISAKOS Congress.

More than 1400 Abstracts were submitted for consideration for presentation at the 2009 ISAKOS Congress—a new ISAKOS record! Special thanks are owed to the more than 80 ISAKOS leaders who participated in the grading process of these abstracts.

Upon completion of the grading process, the ISAKOS Program Committee met at the ESSKA Congress in Porto, Portugal in May of 2008. The primary areas of discussion at this meeting included the development and organization of the scientific program, which will include more than thirty symposia, twenty eight instructional course lectures, and daily surgical demonstrations.

The Program Committee is also pleased to announce that two pre-courses will be offered at the 2009 ISAKOS Congress. The Pre-Courses, held on April 4, 2009, will focus on “Total Knee Arthroplasty and Navigation” and “International Team Physician Course: Hot Topics in Sports Medicine”. More information about the Pre-Courses will be available in the ISAKOS Congress Preliminary Program.

More information related to specific Congress content will be available in July 2008—please look for the 7<sup>th</sup> Biennial ISAKOS Congress Preliminary Program to be mailed in August 2008. Additional information related to the ISAKOS Congress is also available on the ISAKOS website at [www.isakos.com](http://www.isakos.com).

*We hope to see you in Osaka on April 5–9, 2009 for another exciting and educational ISAKOS Congress.*

### Congress Highlights

- Integration Between EBM and Future Challenges
- The Future of Sports Medicine
- Double Bundle ACL Reconstruction: Any Clinical Evidence?
- Cartilage Repair: Present and Future
- Knee Arthroplasty: Unicondylar versus Total
- Minimally Invasive Arthroplasty
- Athletic Shoulder: Difficult Problems and Controversies
- Difficult Elbow Problems
- Advancement in Ankle and Hip Arthroscopy
- Difficult Knee Problems: PCL, Meniscal, and Patellofemoral
- Overuse: Evidence-based Overview

### Featured Sessions

- Scientific Paper Presentations
- Electronic Poster Exhibits with Best 20 E-posters
- Socratic Debates
- Surgical Demonstrations
- Instructional Course Lectures
- Partner Society Lectures
- Didactic Lectures
- Hands-on Workshops
- Technical Exhibits

[www.isakos.com](http://www.isakos.com)

# 7<sup>TH</sup> BIENNIAL ISAKOS CONGRESS

# FAQS

## How much does it cost to register?

The cost of registration depends on the registration type, how the reservation is completed, and when the registration is received.

All prices are given in US dollars.

Category	Early (by Dec 31)	Late (Jan 1-Mar 1)	Onsite
Member*	\$600	\$700	\$800
Non-Member	\$850	\$950	\$1050
Presenter/Faculty	\$675	\$775	\$875
Allied Health**	\$400	\$500	\$600
Resident/Fellow**	\$400	\$500	\$600
Pre Course: Member	\$200		
Pre Course: Non-Member	\$250		

\* Members are required to have paid all dues owed to ISAKOS. If dues are not paid prior to registering, they will be requested at the time of registration.

\*\* Allied Health and Resident/Fellow Registrants must provide proof of status when picking up badge onsite. Those who are unable to provide proof of status will be asked to pay the full registration price.

Please note that you can save \$25 by registering online via the ISAKOS website. Discounts will be taken from the total registration fee automatically before the registration fee is charged.

Online registrations must be completed by midnight on March 1, 2009. After March 1, you will need to register onsite in Osaka.

## If I am a presenter or member of the faculty, is my registration fee waived?

Due to the large number of presenters participating in the ISAKOS Congress, presenters' registration fees are NOT waived. ISAKOS does offer a discounted registration rate for presenters. If you are a presenter who qualifies for a less expensive registration rate (ie-resident/fellow or ISAKOS member), please register at the less expensive registration rate.

## How can I pay for my ISAKOS Congress Registration Fees?

Registrants can pay for their registration fees in three ways: by credit card, by check, and by wire transfer. Please see below for more information:

- **Credit card**—ISAKOS accepts Visa, MasterCard and American Express. Please note that charges will be processed immediately when the registration is completed. Payment with credit card is required if using the online Registration system
- **Check**—ISAKOS will accept checks for payment of registration fees raised by a US bank in US dollars. The check must be mailed to the ISAKOS office. Please note that your registration will be revoked if the check cannot be deposited.
- **Wire transfer**—Wire transfers are only available by contacting the ISAKOS office. Wire transfers must be accompanied by a Wire Transfer Authorization form and contain specific information related to the registrant. Wire Transfer forms must be faxed to the ISAKOS Office with the registration forms. Please note that registrations will not be processed until the wire transfer is received in the ISAKOS bank account.

## I faxed in my registration form, when will I receive confirmation of my registration?

You will receive your email confirmation one week after the form is received in the ISAKOS Office. If you have not received a response within 10 days, please contact the office. Please note that registration confirmations will ONLY be sent via email.

## Who do I contact to make arrangements for hotel and flight reservations?

The ISAKOS Office is not involved in the booking of hotel or flight reservations. KNT! Kinki Nippon Tourist, Co., Ltd in Osaka will be able to assist registrants with making hotel reservations. Please visit the ISAKOS website for a link to make hotel reservations online or for contact information for KNT! Kinki Nippon Tourist, Co., Ltd. ISAKOS is not able to assist registrants with the booking of flight reservations.



# 2009 ISAKOS AWARDS & FELLOWSHIPS

## ISAKOS CONGRESS AWARDS

### JOHN J. JOYCE AWARD

*Sponsored by Smith & Nephew, Inc., Endoscopy Division*

A cash prize will be awarded for the best arthroscopy paper presented during the scientific program in Osaka. All arthroscopy papers presented will automatically be considered for this award. Second and third place prizes will also be granted.

### RICHARD B. CASPARI AWARD

*Sponsored by DePuy Mitek*

The Richard B. Caspari Award was established in 2003 at the 4<sup>th</sup> Biennial ISAKOS Congress in Auckland, New Zealand to reward the best upper extremity paper presented during the scientific program of the Congress. A panel comprised of members of the ISAKOS Upper Extremity Committee will select two prize-winning papers in 2009. The winners will be announced in Osaka, Japan at the awards ceremony and an honorarium will be awarded.

### SCIENTIFIC AWARD

Beginning at the 2007 ISAKOS Congress in Florence, Italy, a monetary prize was awarded to the best scientific paper read at the scientific program of the congress. A panel composed of members of the ISAKOS Scientific Committee will select the prize-winning paper read at the 2009 Congress. The winner will be announced in Osaka, Japan at the awards ceremony and an honorarium will be awarded.

## ISAKOS AWARDS & FELLOWSHIPS

### ALBERT TRILLAT YOUNG INVESTIGATOR'S AWARD

*Sponsored by Stryker*

Established in memory of Professor Albert Trillat, past president and founder of the International Society of the Knee, this award provides recognition for a young researcher who has done outstanding clinical laboratory research contributing to the understanding, care or prevention of injuries to the knee. The award consists of an honorarium, presentation of the paper at the 2009 ISAKOS Congress and possible publication in the *American Journal of Sports Medicine*. For award guidelines and to apply, visit [www.isakos.com/awards](http://www.isakos.com/awards).

**Deadline: October 1, 2008**

## ACHILLES ORTHOPAEDIC SPORTS MEDICINE RESEARCH AWARD

*Sponsored by DJO, Inc.*

This ISAKOS award program recognizes researcher(s) who have done outstanding clinical or laboratory research in the field of sports medicine, such as the care and prevention of injuries. The award consists of an honorarium, presentation of the paper at the 2009 ISAKOS Congress and possible publication in *Arthroscopy: The Journal of Arthroscopic and Related Surgery*. For award guidelines and to apply, visit [www.isakos.com/awards](http://www.isakos.com/awards).

**Deadline: October 1, 2008**

## The Patellofemoral RESEARCH EXCELLENCE AWARD

*Sponsored by The Patellofemoral Foundation, Inc.*

The Patellofemoral Research Excellence Award was established in 2003 to encourage outstanding research leading to improved understanding, prevention and treatment of patellofemoral pain or instability. The selection of the winner is determined by a committee with representatives from the scientific and knee committees of ISAKOS, The International PF Study Group and The Patellofemoral Foundation. The award consists of an honorarium and the presentation of the paper at the 2009 ISAKOS. For award guidelines and to apply, visit [www.isakos.com/awards](http://www.isakos.com/awards).

**Deadline: October 1, 2008**

## The Patellofemoral TRAVELING FELLOWSHIP

*Sponsored by the Patellofemoral Foundation, Inc.*

This travel award is to promote better understanding and communication regarding patellofemoral pain. This opportunity will be available on a competitive basis to an orthopaedic surgeon interested in the study and advancement of understanding of the patellofemoral joint. Preference will be given to those who have established an academic record of accomplishment. The Patellofemoral Foundation will provide a stipend to permit visits to several centers, worldwide, that offer opportunities to learn about the complexities of patellofemoral pain. The fellow will write a report of the experience which will be considered for publication in *Arthroscopy*, the official journal of ISAKOS. For award guidelines and to apply, visit [www.isakos.com/awards](http://www.isakos.com/awards).

**Deadline: October 1, 2008**

[www.isakos.com](http://www.isakos.com)

# YOUR COMMITTEES AT WORK

## ARTHROSCOPY COMMITTEE:

The ISAKOS Arthroscopy Committee met on March 5, 2008 in San Francisco, California prior to the AAOS Annual Meeting. Six Committee members participated in the meeting.

The primary areas of discussion included a video presentation of the Arthroscopy of Normal Joints Project, discussion of the Terminology Project in cooperation with ESSKA, grading of the John Joyce Award, and contributions of the Arthroscopy Committee to the ISAKOS Biannual Newsletter.

The Arthroscopy Committee has completed the video presentations for the Anatomy of Normal Joints, and Mark Safran is currently working on the voice-overs. The Arthroscopy Committee aims to have the video presentations available on the ISAKOS Members Only website by September 2008. Mark Clatworthy and Niek Van Dijk are currently working with ESSKA on finalizing the terminology project.

The Arthroscopy Committee would like to welcome new members Keith Lawhorn and Pascal Christel.

The next meeting of the Arthroscopy Committee is scheduled to occur at the 2009 AAOS Annual Meeting in Las Vegas, Nevada.

## COMMUNICATIONS COMMITTEE:



The Committee met on March 4, 2008 in Palace Hotel, San Francisco, California. Four members participated in the meeting.

The primary areas of discussion included revision of the ISAKOS Leadership Manual including the Committee Charges, and a discussion of the ISAKOS website in order to improve it and make it more active.

The following goals have been accomplished: ISAKOS Award Applications were made available online for the Trillat, Achilles and Patellofemoral Research Excellence awards, as well as the Patellofemoral Travelling Fellowship, and Upper Extremity Travelling Fellowship. Additionally, photographs were added to the ISAKOS Award online applications.

An ISAKOS promotional Power Point presentation is available to all ISAKOS Members. The Power Point is available through the ISAKOS Members Only website. The ISAKOS Communications Committee asks that all ISAKOS Members acting as faculty at local and international meetings, include one slide about ISAKOS and the upcoming ISAKOS Congress in their presentations.

The next meeting of the Committee is scheduled for the 2009 AAOS Meeting in Las Vegas.

## EDUCATION COMMITTEE:



The Education Committee is chaired by David McAllister, MD and Co-Chaired by Kevin D. Plancher, MD and David Rajan, MD. Committee members include Ron Arbel, Antonio Ciardullo, Brian Donley, Joao Espregueira-Mendes, Anastasios Georgoulis, Alberto Gobbi, Milan Handl, Maurilio Marcacci, Thomas

Muellner, Dinshaw Pardiwala, Jai Thilak, Jaime Ulloa, Luis Vargas, and Changlong Yu.

The Education Committee met most recently at the 2008 AAOS Annual Meeting in San Francisco, California in March, 2008. At this meeting, current educational courses were reviewed and approved. 32 courses have been certified as ISAKOS Approved Courses since the last ISAKOS Congress. A current listing can be found at the ISAKOS website <http://isakos.com/meetings/default.aspx>.

Since the last committee meeting in May 2007, the committee has communicated extensively regarding evaluation and approval of ISAKOS sponsored meetings and workshops. Below is a listing of workshops in 2008 which were partially sponsored by ISAKOS.

### **The 24<sup>th</sup> International Jerusalem Symposium on Sports Medicine**

Jerusalem, Israel  
February 3–4, 2008

### **Advanced Surgical Skills and Hands on Cadaver Workshop**

Partner Society: The Chinese Society of Sports Medicine (CSSM); Arthroscopy Association of North America (AANA)  
Fudan University, Huashan Hospital  
\*For a complete report on this meeting please visit page 29.

### **Advanced Team Physician Course: World Congress for Prevention of Sports Injuries**

Oslo Sports Trauma Research Center  
Lofoten, Norway  
June 21–24, 2008

# YOUR COMMITTEES AT WORK

The ISAKOS Education Committee is pleased to announce the approval of a new workshop: the **First Annual Aspetar Arabian Gulf Sports Medicine Meeting** to be held in Doha, Qatar on November 19–20, 2008. For more information on this course, please refer to page 33.

The application and approval process for ISAKOS Approved Courses and Teaching Centers has been streamlined. These processes are now entirely on-line at <http://isakos.com/meetings/default.aspx>. This should allow for an easier and faster application process with Approved Courses and Teaching Centers being automatically posted on the ISAKOS website.

ISAKOS continues to value the contributions of many of the teaching centers worldwide. To acknowledge the contributions of these teaching centers, the ISAKOS Office is working towards an optional plaque available for purchase by interested Teaching Centers.

ISAKOS will be enhancing educational offerings by offering online educational programs. Some material collected at the 2007 ISAKOS Congress is currently available for viewing via the ISAKOS Members Only website. Future plans include CME Educational courses for both members and non-members.

## KNEE COMMITTEE:



The Knee Committee met on Tuesday March 4, 2008 in San Francisco. Eleven members participated in the meeting.

The primary areas of discussion included updating terms and descriptions of awards for which the Knee Committee participates in the selection process, as well as a proposed Current Concepts meeting on navigation in knee surgery

The ISAKOS Knee Committee has completed the Patellofemoral Biomechanics Project. Additionally, the Committee is currently working on the Less Invasive Arthroplasty Project, and a Meniscal Tear Documentation Project which will establish of terms and definitions for treatment of meniscal tears. The Knee Committee is also participating in the development of a pre-course for the ISAKOS Congress.

The Knee Committee is currently planning to complete all pending projects, as well as a Current Concept meeting on Navigation in Knee Surgery to be held immediately prior to the 7<sup>th</sup> Biennial ISAKOS Congress in Osaka.

## MEMBERSHIP COMMITTEE:



The ISAKOS Membership Committee met in San Francisco at the AAOS meeting in March 2008, USA under the guidance of



Chairman Dr. M. Nedim Doral and co-chair by Dr. Allan Anderson.

The Membership Committee is pleased to report that ISAKOS currently has 2,325 members from 84 different countries. It is a goal of the ISAKOS Membership Committee to add 200 new members by September 1, 2008. The Membership Committee believes that it is critical that ISAKOS continues to attract new members, especially young surgeons who represent the future of the Society.

Regional Coordinators have been appointed to increase ISAKOS' presence around the world. These Regional Coordinators will be the first point of reference for ISAKOS Members in their region of the world.

### Regional Coordinators

Mitsuo Ochi, Asia  
John Bartlett, Asia-Pacific  
Jose Huylebroek, Europe  
Robert Śmigielski, Eastern Europe  
Allen Anderson, North America  
Rene Abdalla, South America

Other topics discussed included increasing ISAKOS' presence at regional courses and working face-to-face to promoting ISAKOS to the young and future active members.

## SCIENTIFIC COMMITTEE:

The Scientific Committee, under the direction of chairman Dr. Savio Woo, is pleased to report that they have been working closely with ISAKOS Program Committee Chair, Dr. Kazunori Yasuda in the development of the program for the 2009 ISAKOS Congress in Osaka, Japan.

The Congress will feature four exciting symposia covering a wide spectrum of orthopaedic sports medicine, including the Future of Sports Medicine, Computer-Assisted Surgery for ACL and Arthroplasty, Knee Surgery for Cartilage: From Cells to Metal, and Evidence Based Medicine for Multiple Ligament Injuries. These are very timely topics and will have experts in the respective fields to present their thoughts and findings as well as indications for future work.

## SCIENTIFIC COMMITTEE *(cont.)*

The Scientific Committee will also present Instructional Course Lectures on Evidence Based Orthopedics 101, Therapy for Chondral Lesions: Where We Are and Where We Are Going, as well as Syndesmotic Injuries of the Ankle.

Please find enclosed in this newsletter, an article from Dr. Kazunori Yasuda on "Double Bundle ACL Reconstruction" (page 25). Future topics for the Newsletter include "The Future of Sports Medicine" co-authored by Dr. Nori Nakamura and Dr. Savio Woo., "Multiple Ligament Injuries" written by Dr. Bruce Levy, and "Computer-Assisted Surgery" written by Dr. Stefano Zaffagnini.

The Scientific Committee is truly dedicated to publishing a series of Evidence Based Medicine papers in the Arthroscopy Journal. The Committee is working with the editor, Dr. Gary Poehling, to publish one paper in each issue of the Journal starting later this year. At the present time, under the leadership of co-chairs, Dr. Jon Karlsson and Dr. Robert Marx, the committee has a series of papers in hand to be reviewed and submitted. These papers are "Systematic Review of the Treatment of Traumatic Anterior Instability of the Shoulder: Non-Operative and Surgical Treatment" by Drs. Brophy and Marx; "Current Concept of Double Bundle ACL Reconstruction" by Dr. Yasuda; "An Analysis of the Quality of MCL Repair Studies" by Dr. Engebretsen; and "Cell Based Therapy and Articular Cartilage Lesions of the Knee" by Drs. Nakamura, Mihata, Yoshikawa and Engebretsen. These exciting papers will offer valuable scientific information to the readers and ISAKOS members.

The ISAKOS Scientific Committee Chairman, Dr. Woo, would like to thank his committee members for their diligent work to promote science. With a focus on translational research, ISAKOS members will be able to choose appropriate methods that are scientifically based in treating patients.

## UPPER EXTREMITY:



The Upper Extremity Committee met on Tuesday, March 4, 2008 in San Francisco, California. Seventeen members of the committee attended, including Committee Chairman Benno Ejnisman, Deputy Chairman Ben Kibler, Klaus Bak, Guillermo Arce, Philippe Hardy, Anthony Miniacci, Kevin Plancher, Gary Poehling,

Ettore Taverna, Alessandro Castagna, Eiji Itoi, David Lindner, Matthew Provencher, Ethan Wiesler, Mario Larrain, Vicente Gutierrez, and Mauricio Guttierrez.

The primary areas of discussion included grading for the Caspari Award and Upper Extremity Travelling Fellowship, contributions to the scientific program for the 2009 ISAKOS Congress in Osaka, and the online Elbow Dislocation Survey.

The following goals have been accomplished: Rehabilitation online survey, Biceps Consensus meeting CD distributed in Florence, and the Rehabilitation After Shoulder Injury arthroscopy paper is currently in press.

The Upper Extremity Committee looks forward to working on the Acromioclavicular internet survey, as well as the Shoulder Instability Consensus Meeting to be held in Cancun during the SLARD and AMECRA Congress.

The Committee held a closed meeting on June 3–4, 2008 in Cancun. This closed meeting focused on Shoulder Instability. More information, including the results of this meeting will be available in the Winter 2009 ISAKOS Newsletter.

# MEMBERS

## NEW MEMBERS

We depend on our members to make the society what it is today and to embrace the potential it has in the future. It is the responsibility of members to recruit NEW MEMBERS to join ISAKOS and its goal to reach across the world.

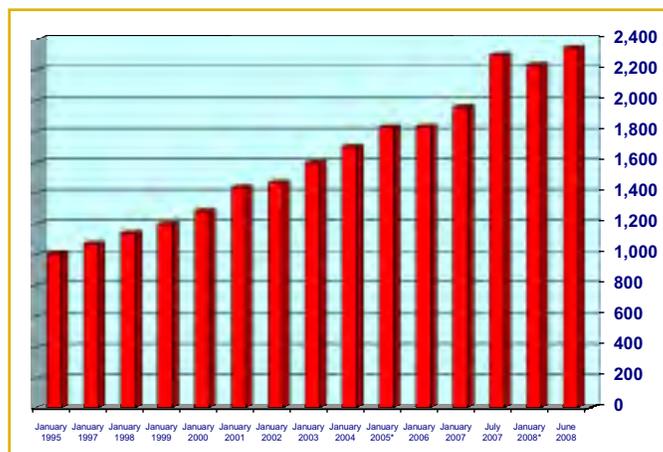
Download an application online at [www.isakos.com](http://www.isakos.com) or contact the ISAKOS office at (925) 807-1197 for a NEW MEMBER Recruit Packet.

## ISAKOS MEMBER GROWTH SINCE 1995

Year	Total Number of Members
June 2008	2,345
January 2008*	2,231
July 2007	2,297
January 2007	1,958
January 2006	1,832
January 2005*	1,828
January 2004	1,700
January 2003	1,598
January 2002	1,467
January 2001	1,437
January 2000	1,282
January 1999	1,198
January 1998	1,141
January 1997	1,071
January 1995	1,005

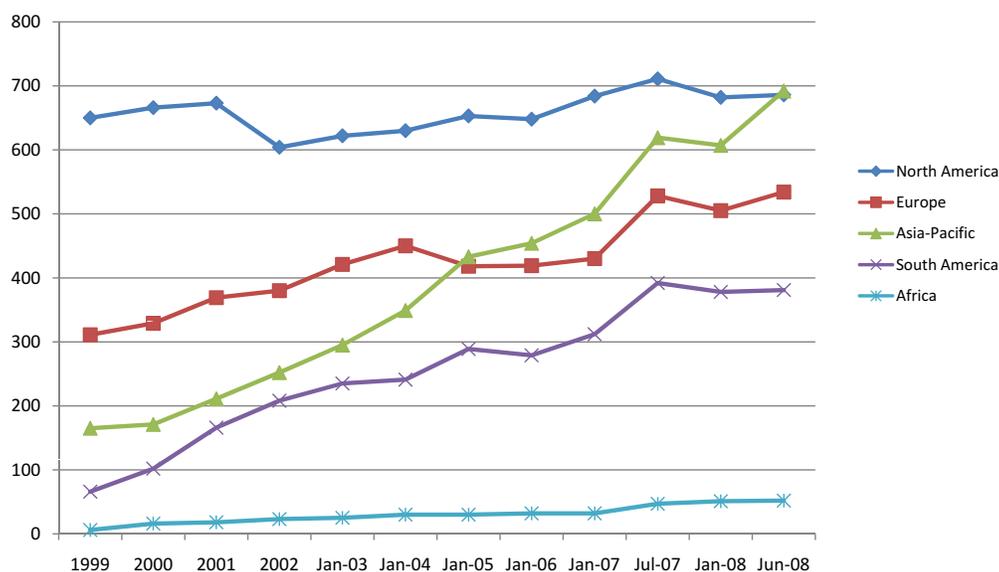
\*Office Purges Non-Paying Members on Continual Basis.

## ISAKOS MEMBERSHIP GROWTH



## ISAKOS MEMBERSHIP GROWTH BY REGION

Growth by Region	1999	2000	2001	2002	Jan-03	Jan-04	Jan-05	Jan-06	Jan-07	Jul-07	Jan-08	Jun-08
North America	650	666	673	604	622	630	653	648	684	711	682	686
Europe	311	329	369	380	421	450	418	419	430	528	505	534
Asia-Pacific	165	171	211	252	295	349	433	454	500	619	607	692
South America	66	102	166	208	235	241	289	279	312	392	378	381
Africa	6	16	18	23	25	30	30	32	32	47	51	52
<b>TOTAL</b>	<b>1,198</b>	<b>1,282</b>	<b>1,437</b>	<b>1,467</b>	<b>1,598</b>	<b>1,700</b>	<b>1,828</b>	<b>1,832</b>	<b>1,958</b>	<b>2,297</b>	<b>2,231</b>	<b>2,345</b>



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# NEW MEMBER PROFILE

## DR. DAN GUTTMANN

ISAKOS Member Since 2008



I first learned of ISAKOS when I was in clinical practice, and I became involved in prospective outcomes research on the topic of arthroscopic shoulder reconstruction. My partner, Dr. James Lubowitz, invited me to be co-author of a podium presentation at the ISAKOS biannual congress, and he recommended that I consider joining because my experiences meeting and networking with surgeons from all over the world.

I completed an orthopaedic residency at Albert Einstein Medical Center in Philadelphia. After my residency, I finished a Fellowship in Shoulder and Elbow surgery at the New York University/Hospital for Joint Diseases in New York City from 1999 to 2000.

After my Fellowship, I came to Taos, New Mexico in 2000 and joined Dr. Lubowitz at the Taos Orthopaedic Institute and Sports Medicine Fellowship Program that has now been in place over the last eight years. My focus is on arthroscopic reconstructive shoulder surgery. Specifically, I have looked at the learning curve of arthroscopic rotator cuff repair and have focused on improving the results for patient undergoing this procedure. Working with Fellows has been a fantastic experience and has constantly challenged my knowledge of how best to treat and reconstruct shoulder injuries.

After five years in practice, I was chosen to be one of three surgeons participating in the Arthroscopy Association of North America (AANA) inaugural Traveling Fellowship. During that Fellowship as well as during my training in New York, I was exposed to other traveling or visiting surgeons from all over the world. I was impressed by the degree of knowledge, experience and sophistication in the International surgeon community. I was also surprised by the relative lack of understanding held by some North American surgeons regarding the expertise and experience of our international colleagues. ISAKOS solves this problem.

I attended my first ISAKOS Congress in Florence, Italy in 2007. This was an incredible meeting with a diverse population of surgeons from all over the world. I had the privilege of meeting many surgeons from Europe, Asia, Australia, Africa and South America. This experience has led to personal contacts and collaboration, as well as visits to some of these continents. This year we have been privileged to have a surgeon from Japan come to Taos, New Mexico as our first International Fellow.

I have submitted my abstracts for the meeting in Osaka, Japan. I look forward to continuing to be involved in ISAKOS and encouraging my current and former Fellows and other colleagues to join, so that they can get a more global perspective and view of orthopaedics.

### Dr. Dan Guttman

Taos Orthopaedic Institute  
Taos, New Mexico, USA

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NEW MEMBER  
AND WIN  
A FREE  
CONGRESS  
REGISTRATION!**



ISAKOS membership applications are now available online at [www.isakos.com](http://www.isakos.com)! Refer a new member before September 1, 2008, and you will be entered to win a free registration for the 2009 ISAKOS Congress in Osaka, Japan. Please note that this offer only applies to new ISAKOS member applications submitted online.

**ONLY APPLICABLE TO NEW  
ONLINE APPLICATIONS**

[www.isakos.com](http://www.isakos.com)

# TEACHING CENTER SPOTLIGHT

## HUASHAN HOSPITAL

## FUDAN UNIVERSITY SPORTS MEDICINE CENTER

### CONTACT ADDRESS:

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The Department of Sports Medicine and Arthroscopic Surgery at Fudan University Huashan Hospital, Fudan University Sports Medicine Center, is a leading clinic of sports medicine in China. The Center has been recognized as an exclusive unit for professional athletes with sports injuries by the Shanghai Municipal Sports Bureau and is the preferred medical center for major international sports events in Shanghai.

The department contains 6 sections:

- Inpatient Ward
- Sports Rehabilitation Center
- National Training Center for Arthroscopy Surgery (Approved by the Health Ministry of the People's Republic of China)
- Podiatry Sports Medicine
- Sports Medicine Research Laboratory
- Shanghai Important Sports Events Medical Service Office.

Every year the Sports Medicine Center sees 20,000 patients and performs about 1,200 arthroscopic operations, including shoulder, elbow, wrist, hip, knee and ankle. All faculty have been trained in the United States of America,



Europe, or Australia. With the Center's state-of-the-art technology and surgical techniques, many national elite athletes have been treated at the Center, illustrating the impact and status of sports medicine in China. In addition to clinical services, the Center has conducted extensive research on muscle injury, artificial ligament, cartilage regeneration, and the biomechanics of joints. This research is supported by national or Shanghai Municipal grants.

In the past five years, the Center had organized five international symposia and national courses on orthopaedic sports medicine and arthroscopic surgery with great success, including conferences for more than 1000 doctors, and participation of approximately 300 surgeons in cadaver workshops. In October 2007, a first-class arthroscopy training center was built in Huashan Hospital, with eleven brand new stations for cadaver workshops and live surgical demonstrations.

The Center offers various fellowships (3–12 months) with surgical training, clinical research or basic research activities. Additionally, visitors for shorter time periods, and attendees for seminars or courses are always welcome.



## ADVANCES IN ARTHROSCOPIC TREATMENT OF ROTATOR CUFF DISEASE: *Are Two Rows Better than One?*



**KEITH W. LAWHORN, MD**  
Fairfax, Virginia USA

### INTRODUCTION

Arthroscopic rotator cuff repair is an operative advancement in the management of rotator cuff tears, however it is a technically demanding procedure with a steep learning curve. Suture anchor devices along with advances in suture passage instrumentation in large part have made arthroscopic repair possible. Suture anchor fixation of rotator cuff tears has largely replaced the former open transosseous techniques to secure the rotator cuff tendon to the bony tuberosity. The strength of suture anchor fixation exceeds transosseous suture fixation of the torn rotator cuff. Numerous arthroscopic suture anchor fixation devices, cuff stitch configurations and constructs exist for arthroscopic repairs. These suture anchor constructs continue to evolve in an effort to improve cuff tendon healing rates to bone leading to possibly improved long term outcomes. Arthroscopic suture anchor constructs now include single row repairs, transosseous equivalent repairs and double row repairs. Currently, there is no clear cut consensus based on published biomechanical and clinical studies as to whether any one of these techniques will prove to be superior long term with regards to clinical outcomes and objective tendon healing.

### ARTHROSCOPIC REPAIR CONSTRUCTS

Single row repairs are the simplest repair construct to perform. This repair construct consists of repair of the cuff tendon to the greater tuberosity using a single row of suture anchors along the articular margin of the tuberosity or the central tuberosity. A number of suture configurations can be performed from simple suture, horizontal mattress, or a grasping stitch such as the Mason-Allen and the massive cuff stitch. The transosseous equivalent (TOE) is simply a single row repair using a mattress suture configuration with added fixation of the free ends of the suture from the single row sutures in the lateral tuberosity using a knotless anchor device. The transosseous equivalent compresses the cuff against the tuberosity and improves the surface area of tendon to bone. The double row repair is technically the most demanding and most expensive consisting of two rows of suture anchors with a row of fixation of the cuff

along the medial subchondral articular margin of the tuberosity and the second row along the lateral margin of the tuberosity. The sutures of the medial row fixate the cuff tissue using a mattress suture configuration while the lateral row typically fixates the tendon using a simple suture configuration. The double-row technique enables surgeons to re-create the anatomic footprint of the native cuff insertion maximizing the cuff tendon-to-bone surface area for healing of the repair.

### BIOMECHANICAL STUDIES

With the different arthroscopic repair constructs available to orthopaedic surgeons, are there biomechanical advantages of one construct over another? Some surgeons feel there is no justification for rotator cuff repair constructs other than single row repairs based on several recent biomechanical and clinical outcome studies that did not demonstrate superior clinical outcomes with double row repairs compared to single row repairs. These biomechanical studies did not demonstrate differences with regards to load to failure, cyclic displacement and gap formation. Mazzocca et al. were unable to demonstrate the biomechanical superiority of double row techniques over single row repairs in a human cadaveric model. There was no statistical difference with regards to cyclic displacement and load to failure when comparing the different constructs. However, looking at their data carefully, the mode of failure was different between single row and double row repairs. The majority of single row repairs failed by a combination of anchor failure and suture pullout through the tendon whereas the majority of double row repairs failed by the sutures tearing through the tendon. This observation is significant in that the tensile loads may have been more concentrated at the anchor sites for the single row repairs compared to the double row repairs where the tendon itself appears to be the weak link. Mahar et al. demonstrated no differences in elongation under cyclical load conditions and ultimate tensile failure loads of single row versus double row repairs in a bovine cadaveric model.

Other studies however, have demonstrated superior load to failure, cyclic displacement and gap formation in addition to improved footprint restoration for double row repairs compared to single row repairs. Smith et al. demonstrated significantly greater gap formation with the single row repairs compared to the double row repair constructs in a human cadaveric model. Load to failure was also greater for the double row repairs. Similar to the findings of Mazzocca et al., the single row repairs failed by a combination of anchor and suture failure while the double row repairs failed by tendon tearing from the suture or tendon rupture medial to the fixation construct. Ma et al. demonstrated the

## ADVANCES IN ARTHROSCOPIC TREATMENT OF ROTATOR CUFF DISEASE: (cont.)

ultimate tensile failure loads for double row repairs were significantly greater than for single row repairs in a human cadaveric model. Lorbach et al. recently demonstrated double row repairs to have the highest tensile failure loads and lowest gap formation compared to a transosseous equivalent and single row repair constructs tested in a porcine model. Park et al. recently demonstrated anterior strain and gap formation to be greater under dynamic external rotation conditions compared to linear tensile loading of a fixed humerus. The authors divided human cadaveric specimens randomly into 2 groups. In group one the humeral specimens were permitted to externally rotate 0-30 degrees during tensile loading while the specimens in group 2 were fixed in the traditional fashion to prevent any rotation. All specimens in group one (rotation group) demonstrated greater strain in the anterior cuff and less strain in the posterior cuff. As a follow-up study to the Park et al study, Ahmad et al recently published improved biomechanical properties of a double row repair construct cyclically tested under internal and external rotation conditions compared to a single row construct. Biomechanical testing under conditions involving rotational loads as well as linear loads better duplicate forces on the repair site experienced during the early post-operative period. Lastly, no controversy exists with regards to the superiority of footprint restoration with a double row repair. The above studies all demonstrated improved tendon to tuberosity restoration of the cuff tear with double row constructs compared to single row repairs. Despite a more anatomic restoration of the tendon-tuberosity footprint, clinical studies are required to further determine if the various repair constructs result in different long term clinical outcomes and objective cuff healing.

### CLINICAL OUTCOME STUDIES

With the different arthroscopic repair constructs available to orthopaedic surgeons, is there a clinical gold standard? As with the biomechanical studies, controversy also exists with regards to clinical outcomes of the various repair constructs. However, many of these reported studies are short term, lack a control group and some do not include objective diagnostic evaluation for cuff repair healing. In addition, it may difficult to compare between studies since rotator cuff size, tissue quality and chronicity of tears may be significantly different.

Galatz et al. demonstrated clinical improvement with early follow-up of 18 patients undergoing single row arthroscopic repair of medium to large sized cuff tears 2cm or larger. Despite early clinical improvement 17 of the 18 patients experienced recurrent cuff defects based on ultrasound

evaluation post-operatively. Was the high rate of cuff defects due to an arthroscopic single row repair or rehab or poor tissue quality is unknown. Subsequently, the authors also noted deterioration in the clinical outcomes at 2 years compared to 1 year post-operatively. Therefore, early clinical success and improvement may be seen in the early post-operative period regardless of whether cuff repair healing to bone was successful. In fact patients with small tears and failed repairs may be difficult to differentiate clinically from patients with small tears and complete healing with short term follow-up. Thus when comparing these different repair constructs, particularly in the setting of small tears, diagnostic evaluation of the repairs is in order to determine if there is a difference in cuff repair healing between the different techniques.

In an effort to determine what affect a rotator cuff repair construct might have on clinical outcomes and cuff healing, a number of studies have been performed comparing single and double row constructs for medium to large tears. In a prospective randomized Level I study by Franceschi et al., no statistical difference was detected between single and double row repairs of large and massive sized tears based on functional outcome and MR arthrography. However, the study population was small and no power analysis performed to determine if the sample size was adequate. Despite these weaknesses, the study was well-performed. A recent study presented at the 2008 AAOS meeting by Burks et al found no difference between single and double row repairs based on clinical outcome and MR evaluation at 1 year post-op. The average sized tear in the 2 groups was somewhat smaller than many of the studies comparing the two different repair constructs with an average size tear of 1.8cm for the single row and 1.9cm for the double row group. It is unclear whether the smaller tear size favors the single row technique and whether these results will hold up with longer follow-up. Nonetheless, there are no published studies demonstrating superior clinical outcomes and cuff healing for the single row construct when compared to the double row technique.

Other published studies however have demonstrated improved cuff repair healing but equivalent functional outcomes comparing a double row construct to a single row. Sugaya et al. retrospectively reviewed 80 patients undergoing rotator cuff repair. Forty-one patients underwent a double row repair and 39 patients a single row repair. On an average of 35 months follow-up, functional outcomes were similar between the two groups however MRI evaluation demonstrated statistically better structural integrity of the double row repairs compared to the single

row repairs. Huijsmans et al. reviewed 242 patients undergoing double row cuff repairs both clinically and with ultrasonography performed at a minimum of year post-op. Eighty-three percent of patients demonstrated an intact repair by ultrasound. Patients with an intact repair had better forward elevation and strength but pain scores were no different. More importantly, many patients in this study had large tears. Seventy-three patients had massive (>5cm) and large tears (>3 to 5cm), 121 patients had medium sized tears (1 to 3cm) and only 16 patients had small tears. Lafosse et al assessed the outcome of 105 patients undergoing arthroscopic double row repair. Sixty-nine patients had large to massive-sized tears and 36 patients had small tears. At a minimum of 2 years follow-up, 89% of patients had intact repairs documented by CT or MR arthrography. No single row repairs were performed in the study. Therefore, patients with medium sized tears and larger may benefit from double row cuff repairs if possible rather than single row repairs. However, not all large tears will be amenable to double row repair depending on the quality of the tissue and cuff tendon mobilization. Appropriate use of interval slides and margin convergence is imperative to accomplish low tension repairs in chronically retracted large cuff tears. It is ill-advised to perform a double row high tension repair rather than decreasing the tension on the repair by fixating the contracted mobilized cuff to the medial footprint with a single row. Thus, based on the current body of clinical literature, controversy remains regarding whether double row repair techniques are superior to single row techniques based on clinical outcomes and objective cuff healing. Additional prospectively randomized trials involving large cohorts are still needed to better determine if the different repair constructs affect clinical outcomes and cuff healing.

## THE FUTURE

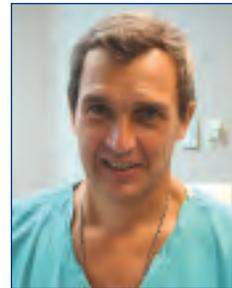
Nonetheless, arthroscopic rotator cuff repair continues to evolve today. New techniques are currently under development including the linkage of suture anchors to distribute loads between anchors and compress a greater area of cuff tendon between anchors to bone. In addition, tissue augmentation devices and the use of growth factors and mesenchymal cells injected into the repair sites are currently being investigated and may further improve healing rates. At the present time based on the current body of published scientific literature, it is reasonable to consider double row repairs for larger sized tears if these tears are amenable to a double row repair technique. For small tears, a single row repair should suffice but again, a surgeon could not be faulted for performing only single row repairs. Nonetheless, arthroscopic rotator cuff repair techniques will continue to improve and evolve ultimately leading to better healing rates and long term functional outcomes.

Full article and references also available online at [www.isakos.com](http://www.isakos.com).

## COMBINED SLAP AND BANKART LESIONS REPAIR

### SLAP V

*Arthroscopic Repair of Combined SLAP and Bankart Lesions.*



**GUILLERMO ARCE, MD**

**BENNO EJNISMAN, MD  
ANTONIO CARTUCHO, MD  
ENRIQUE PEREIRA, MD  
FRANCISCO ARCURI, MD**

### OVERVIEW:

Many papers have been presented since S. Snyder coined the term Superior Labral Anterior Posterior (SLAP) lesion. After the main four types of SLAP were described, the focus was centered on the SLAP associated injuries. The former author, in a review of 140 cases, reported that only 28% of the SLAP lesions were isolated and found a 22% incidence of Bankart lesion associated with SLAP lesion. Maffet et al. added three more types to the former four. Type V is the combination of superior and anteroinferior labral avulsion. SLAP lesions arise from different injury mechanisms. Traumatic non-throwing SLAP injuries are common in IberoLatinamerican communities. Their association with an anteroinferior labrum detachment is a challenging situation for athletes. Arthroscopic techniques over the open procedures are suitable for an accurate reconstruction of the involved structures.

### PURPOSE:

The aim of this study was to retrospectively evaluate patients who underwent arthroscopic treatment for SLAP lesions combined with anteroinferior labral reconstruction (Maffet SLAP V). Type of Study: Case Series. Level IV.

### METHODS:

Out of 123 arthroscopic shoulder stabilization procedures performed in our institutions in a three year period, 21 (17%) patients presented a superior labrum detachment which deserved suture anchor fixation. Eighteen patients (15 males and 3 females) with a mean age of 27 years (range

## COMBINED SLAP AND BANKART LESIONS REPAIR (cont.)

17 to 43 years) were available for a mean follow up of 35.5 months (range 24 to 56 months). In all the patients the symptoms started after trauma. The main preoperative complaint was instability with dislocations and subluxations in 15 shoulders. Three patients suffered pain alone without important signs of instability. Nine patients (50%) noted mechanical catching or grinding in their shoulders. The O'Brien Active Compression Test suggesting superior labrum injury was positive only in 6 cases due to the fact that the patients complained about pain and instability in abduction and external rotation more than in any cross arm test. The preoperative diagnosis was instability in all the cases. In this series of cases the non contrasted MRI failed to demonstrate the complete lesion. Twelve patients presented Hill Sachs lesions. Four moderate bony Bankarts were seen preoperatively. Due to the lack of an accurate preoperative diagnosis the surgeon must be prepared to fix all the involved structures being found at the surgical procedure.

### SURGICAL TECHNIQUE:

The patient was placed in the lateral decubitus position with 3 kg. of anterior and distal skin traction. The Bankart reconstruction was performed through standard posterior, anterosuperior and anteroinferior portals (Photo #1). An average of 4.3 anchors were used to fix the anteroinferior labrum and one of these devices was used to stabilize the superior labrum posterior to the LHB insertion area. As a first step of the procedure the anterior-inferior labrum was fixed with moderate capsular placcation (Photo #2). The SLAP lesion was stabilized later through a posterolateral portal (Port of Wilmington). In some cases due to the plastic deformation of the capsule and the south-north labrum reconstruction, a bulky capsular flap was found anterior to the biceps (Photo # 3-4). We tried to keep the biceps insertion site anatomically at its footprint. The lack of bony landmarks for the biceps and a mobile labrum made this step sometimes tricky (Photo # 5).

### RESULTS:

The included cases were fully preoperatively and postoperatively evaluated with extensive physical exam, UCLA, Constant & Murley and Rowe Scores. At the follow up evaluations two patients were considered clinical failures (11%). One due to dislocations and one for pain and disability to return to sports without instability symptoms. Functional results were excellent-good in 16 patients (89%). The mean UCLA Score increased from 17.1 preoperatively to a 28.8 postoperatively ( $P = 0.00002$ ) with a corresponding increase in the mean Rowe Score from 34.1 to 85 points ( $P = 0.00003$ ). The Constant and Murley Score improve from 63.7 preoperatively to 84.4 postoperatively ( $P = 0.0002$ ).



Photo # 1: *Surgical Findings. SLAP & Bankart*

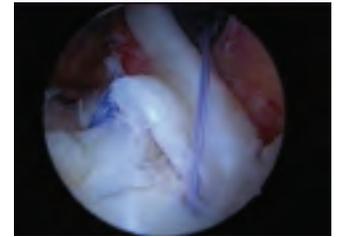


Photo # 4: *SLAP Balance. Posterior anchor placement.*

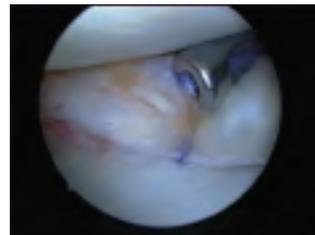


Photo # 2: *Labrum Repair. South North capsular placcation.*

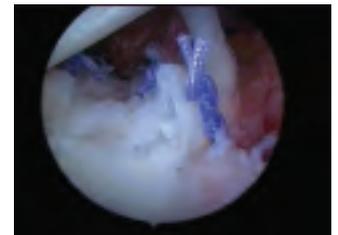


Photo # 5: *Final Repair. Adequate Superior Labrum-Biceps Complex balance.*



Photo # 3: *Bulky SLAP due to anterior capsular shifting.*

### DISCUSSION:

Surgeons need to be aware of the existence of superior labral lesions at the biceps-glenohumeral complex when treating patients with shoulder instability. The diagnosis of SLAP V lesion is difficult to define preoperatively. Even with an arthro-MRI it is difficult to detect the combined injury findings of SLAP lesion type V in one imaging plane, however, a combination of multi-directional images may increase the feasibility of MR in diagnosing the injury before surgery. Parentis's studies demonstrated that an intact and active biceps contribute to joint stability. Mac Mahon found that glenohumeral translations were increased, regardless of severity, after simulation of Type II SLAP lesions. Rodosky and coworkers found that the SLAP lesion created a significant increase in the strain in the inferior glenohumeral ligament. Pagnani et al. found that complete lesion of the superior labrum results in significant increase in anteroposterior and superoinferior glenohumeral

translation. Finally, Tuoheti and coworkers defined the different attachment types of the biceps tendon to the glenoid labrum. They outlined the posterior dominant position of the biceps and the close relationships between the biceps and the middle and inferior glenohumeral ligaments. At the time that these cases were performed we did not have double loaded anchors available to fix the SLAP in a "V" shape configuration. These devices could have been helpful to fully stabilize the biceps at its anatomic location. Lo and Burkhart reported an incidence of 10.4% double and 2.4% triple labral lesions. They followed up seven cases of triple labral injuries with superior, anterior and posterior labrum involved and a 14 % failure rate due to osteoarthritis was found. Due to the dynamic stabilizer function of the biceps, the lack of an accurate fixation of the superior biceps labral complex may jeopardize the final results of shoulder instability cases.

## CONCLUSIONS:

The combined injury of the superior and anterior-inferior labrum is not infrequently seen. Arthroscopic fixation of the avulsed labrum seems to be the mainstay of treatment of these complex injuries. Almost ninety percent of good and excellent results could be expected with arthroscopic repair of these SLAP V injuries.

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## MANAGEMENT OF LATERAL LIGAMENT INJURIES OF THE ANKLE



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## INTRODUCTION

The ankle is a complex joint. Stability is due to osseous and ligamentous elements. Osseous stability is maximal in dorsal flexion. In plantar flexion ligaments play a major role. The anterior talo fibular ligament (ATFL) is a thin elastic ligament preventing anterior talar subluxation. It allows ankle plantar flexion and internal rotation. It is parallel to the fibula in plantar flexion. The calcaneo fibular ligament (CFL) is extra capsular and has an oblique insertion to the postero-lateral calcaneal margin. It is perpendicular to the horizontal subtalar joint axis and is a primary stabilizer of the tibio-talar and subtalar joints, overall in dorsal flexion. It is 4 times stronger than the ATFL. The posterior talo fibular ligament (PTFL) is a strong ligament rarely injured. The wide angle between ATFL and CFL justify the higher risk of sprains in inversion when the ankle is in a neutral position. Ankle injuries are frequent in sports activities: 40% of all athletic injuries are ankle sprains. The vast majority of these sprains are lateral ligament injuries. There is a 20% incidence of residual functional instability in sprained ankles. The most common mechanism of injury is a forced ankle plantar flexion and inversion. The ATFL is the most frequently injured ligament in lateral ankle sprains. Sprains of the medial side of the ankle are rare.

## CLASSIFICATION

Clanton and McBryde classified ankle sprains by anatomic ligament injured and divided the ankle into either stable or unstable.

GRADE	LIGAMENT INJURED
I	ATFL
II	ATFL and CFL
III	ATFL, CFL and PTFL
IV	Deltoid, tibio-fibular

## MANAGEMENT OF LATERAL LIGAMENT INJURIES OF THE ANKLE (cont.)

Grade I lesions are benign and represent 30% of cases

Grade II lesions are frequent in dance since in plantar flexion the CFL is horizontal with less risk of lesion. In these cases the anterior drawer is positive. Talar tilt is positive in case of CFL lesion. (40% of cases) Grade III lesions: complete ATFL and CFL rupture with varus instability Grade IV lesions: in eversion, external rotation and dorsal flexion with deltoid ligament and tibio fibular ligament lesion (15% of cases). In rare cases there is also a syndesmotic tibio fibular lesion that may require surgical correction.

Stability is assessed with specific stability tests: the anterior drawer test and talar tilt test

The Anterior drawer test is performed with the knee flexed to relax the gastrocnemius muscle. The distal tibia is stabilized with one hand and the heel is grasped and pulled forward with the other end. A translation of 5 mm more than the other side indicates an ATFL lesion while the absence of a firm end point means a complete rupture.



Fig 1



Fig 2

The Talar tilt test evaluates the calcaneofibular ligament integrity: distal tibia is stabilized with one hand and the talus is rotated into inversion with the other hand (fig 1,2). If the heel is grasped the evaluation is extended to the subtalar joint and less precise. The degree of talar tilt and endpoint are compared with the normal side. Stress radiographs are usually not required in acute ankle sprains and more used in chronic conditions to document talar tilt and anterior drawer positivity. Magnetic resonance imaging (MRI) and computed tomography (TC) are helpful in diagnosing associated pathologies in painful acute sprains and in chronic instabilities.

### MANAGEMENT OF ACUTE SPRAINS

Acute repair is almost never indicated regardless of the grade of injury. Initially the RICE program (rest, ice, compression, elevation) is important. A prompt elastic compression can limit swelling, reduce the subsequent pain and hasten rehabilitation. Intermittent cryotherapy may enhance the therapeutic effect of ice in pain relief after acute soft tissue injury. Functional rehabilitation is superior to both cast immobilization and surgical repair in the management of most acute ankle sprains. Semirigid ankle supports are better than elastic bandage in acute ligament ruptures and an elastic wrap combined with a brace decreases swelling and accelerates sports resumption. Non steroidal anti-inflammatory drugs and manual therapy can improve short term symptoms. The guidelines for ideal management must follow the biology of ligament repair: the ligaments must be protected in instable ankles for 4 weeks during the healing proliferative phase (20 days) and the successive collagen maturation phase. In this phase controlled mobilization helps the collagen fibres to be orientated in line with stress lines and reduces the side effect of immobilization. Then specific sports rehabilitation can be started. An elastic brace is suggested for several months to enhance proprioception. Neuromuscular training may prevent re-injury even if a randomized controlled trial could not demonstrate any difference in the recovery after conventional treatment combined with supervised exercises compared to conventional treatment alone during the first year after an acute lateral ankle sprain. Clinic based management appears not to be superior to home based physiotherapy. Full recovery of ankle sprains takes time. From 36% up to 85% of the patients report full recovery within a period of 3 years. The clinical course of acute ankle sprains is benign in most cases but instability develops in 10–15% of cases. Samoto et al could demonstrate that the conservative treatment with a functional brace was unsatisfactory in patients with combined ATFL and CFL injuries. The CFL seems to be the most important ankle stabilizer.

### MANAGEMENT OF CHRONIC INSTABILITY

Failed non-operative treatment may require surgical correction. Instability and pain are the major factors leading to surgical correction. Many surgical procedures are described in literature. They are divided in anatomic repairs sometimes reinforced, and non anatomic reconstructions, usually with peroneal tendons. Henricus et al, Wallenbock et al and Liu et al reported superior functional results with anatomical reconstructions and more recently Krips et al confirmed less satisfactory results after non anatomic reconstructions.

Anatomic repairs are superior to non-anatomic reconstructions. Direct repair is based on the Brostrom technique, originally described for acute lesions. Several modified techniques have been published. Some authors advocate the use of periosteal flaps to reinforce the ligaments if the ligament tissue is severely damaged. Even the extensor retinaculum can be used to reinforce the repair in severe varus hind foot a valgus calcaneal osteotomy can be added. The surgical treatment is usually effective and even proprioception can be restored.

## PERSONAL TECHNIQUE

In our experience the talar tilt test was always positive in ankle chronic ankle instabilities while the anterior drawer was clearly positive only in a few cases. The CFL plays a major role in these cases and must always be repaired to correct the ankle functional impairment. Since 1995 we have used a simple mini-invasive technique addressed to the direct repair of CFL and ATFL if necessary. In all surgical cases an MRI is done preoperatively and arthroscopic evaluation and treatment of osteochondral or synovial associated pathologies is added in selected cases only. In all cases the first suture through the CFL could already correct the talar tilt test positivity. The procedure can be done in local or peripheral anesthesia with or without tourniquet. The incision is horizontal 1cm under the tip of the lateral malleolus (fig 3). The peroneal tendons are retracted exposing the capsule (fig 4) and the lateral ankle ligaments. The joint capsule is not opened. Multiple vertical mattress sutures are placed through the CFL and the lower fibular periosteum with the ankle in dorsal flexion and eversion (fig. 5,6,7,8). More horizontal sutures are placed through the ATFL if necessary. The repair does not usually need to be reinforced with the extensor retinaculum. A pneumatic ankle brace or a light cast is applied keeping the ankle in slight dorsal flexion and eversion. An elastic bandage is always applied on the skin to avoid distal edema.

## POSTOPERATIVE CARE

Comfortable partial weight-bearing with crutches is allowed the same day. Early reactivation of peroneal muscles, tibialis anterior and extensors is encouraged. After 4 weeks the ankle brace or the cast are removed and substituted with an elastic ankle brace. Sports activities are resumed 8 weeks after surgery.

Prevention Prevention may act an important role: a sport specific balance training program was effective in reducing acute onset injuries in high school basketball. Prophylactic bracing decreases ankle injuries in female volleyball and basketball players and in soccer players. A history of previous lateral ankle sprain is associated with an increase in the risk of future sprain of the contralateral ankle.

If a prophylactic protection is decided, a semirigid ankle orthosis is less expensive than ankle taping with similar results. Anyway adequate training is the most important prevention. Postural control and muscle reaction time are important variables that must be considered. Ankle muscle strength, ankle joint position sense, ankle bracing and ankle taping action mechanisms are still unclear. Ankle bracing and ankle taping should be prescribed in selected cases.



Fig 3



Fig 4



Fig 5



Fig 6



Fig 7



Fig 8

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## THE EFFECT OF A LATERAL PLASTY IN CONTROLLING SECONDARY ROTATORY LAXITIES IN SINGLE-BUNDLE ACL RECONSTRUCTION. AN IN VIVO STUDY

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### ABSTRACT

**Hypothesis:** The purpose of our study was to quantify, in vivo, the reduction of knee laxity obtained by an extra-articular procedure added to hamstring single bundle ACL reconstruction in controlling residual secondary rotational laxities during Lachman and Drawer test.

**Methods:** In 28 consecutive patients analysis was performed to see if there was a difference in knee laxity during Lachman and Drawer test with ACL deficient knee, after single bundle (SB) fixation and after extra-articular (EA) plasty fixation.

**Results:** At 30°, the SB graft reduces translation of about 5 mm ( $p < 0.05$ ) while the EA procedure controls internal rotation, reducing by 1.6 mm ( $p < 0.05$ ) the translation of lateral tibial compartment. At 90° the SB graft reduces translation and also internal rotation ( $p < 0.05$ ), while the EA procedure contributes in controlling tibial translation reducing laxity by 1 mm ( $p < 0.05$ ) in both compartments.

**Conclusions:** Result shows that in vivo the addition of an EA procedure to single bundle ACL reconstruction may be effective in controlling tibial internal rotation during Lachman test and reduces AP laxity at 90° of flexion.

### INTRODUCTION

Reconstructive procedures for the anterior cruciate ligament (ACL) have become a common surgery in a large number of patients with reported clinical successes ranging from 70% to 95%. Failures may be related, as highlighted by Lie et al., to the persistence of a residual secondary rotational laxity.

Logan in 2004, in an in vivo weight bearing MRI study of the ACL deficient knee, suggests laxity is anterolateral with internal tibial rotation during knee flexion. This anterolateral laxity was detected also by Colombet et al. and Lie et al. which found, in vitro, that a single bundle

reconstruction is not able to control tibial rotation, leaving a residual pivot shift phenomenon. Similarly, Georgoulis et al. showed that the tibia is abnormally internally rotated throughout the gait cycle in ACL deficient knees and this was only partially corrected by SB reconstruction.

Additional extra-articular procedures have been proposed with the aim of control residual rotatory laxities, however the effect of these procedures is still matter of debate. Past studies have indicated that the extra articular plasty reduces the sensation of "giving way" and that the extra articular procedure prevents anterior subluxation of tibial plateau, protecting overloading on the ACL graft.

The purpose of our study was to quantify, in vivo, the reduction of knee laxity obtained by an extra-articular procedure added to hamstring single bundle ACL reconstruction in controlling residual secondary rotational laxities during Lachman and Drawer test.

### MATERIALS AND METHODS

**Patient selection.** From May to September 2006, 28 consecutive patients underwent arthroscopic ACL reconstruction, 21 were men and 7 women, average age was 30 years (range 18-58), average time injury to surgery was 10 months (range 3-48). All subjects included in the study had preoperative C or D IKDC score. Patients with previous ligament reconstruction on the operated knee, concomitant meniscal injury or ligament tears and severe chondral, defect pointed out by the MRI, were not included in the study.

**Surgical technique.** Patients underwent an arthroscopic single-bundle ACL reconstruction performed with doubled gracilis and semitendinosus tendon graft with additional extra-articular procedure (Fig. 1). The study design was approved by the Institutional Review Board of the Institute, and all patients provided their informed consent.



Figure 1. Frontal (a) and sagittal (b) view of the ACL reconstructive technique.

**Intraoperative protocol.** Patients' laxity was evaluated intraoperatively with a software for navigated joint kinematic evaluation (Klee, Orthokey LLC, Delaware). After bone

reference registration the operating surgeon performed standard clinical tests at maximum force to evaluate the antero-posterior (AP) joint laxities at 30° and 90° of flexion in the ACL-deficient knee, during the tests all 6 degrees of freedom of the joint were recorded for further analysis.

The single bundle (SB) graft was inserted into tibial tunnel, fixed with two staples on the femur in the over the top position and laxity tests were repeated.

After this step the additional extra-articular (EA) procedure was executed passing the remaining part of the graft under the fascia lata to reach the Gerdy's tubercle where was fixed with another staple. Laxity tests were repeated again.

Tibial displacement was measured in three different points: on midpoint of tibial plateaus (Fig 2, point C), which is the measure of tibial displacement under standard clinical tests; on medial (Fig 2, point M) and lateral (Fig 2, point L) plateaus.

Statistical analysis. In order to quantify the effect of the SB graft and of the EA procedure we compared the knee laxity of ACL deficient knee with laxity obtained after SB ( $\Delta_{SB}$ ) fixation and EA ( $\Delta_{SB+EA}$ ) fixation respectively. Point C was used to analyze tibial translation. Difference of displacement between point M and L was utilized to evaluate tibial internal rotation during Lachman and drawer tests.

Legend: M=antero-posterior displacement on medial plateaus; C=antero-posterior displacement on tibial centre; L=antero-posterior displacement on lateral plateaus;

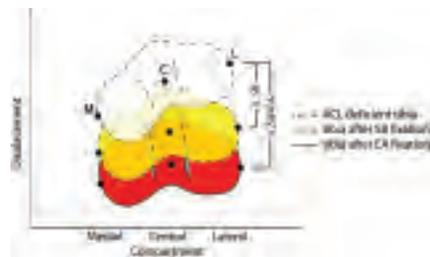


Figure 2. Tibia displacement during AP test.

$\Delta_{SB}$ =difference between ACL deficient knee and knee after Single Bundle graft fixation;  $\Delta_{SB+EA}$ =difference between ACL deficient knee and knee after extra-articular procedure on medial compartment;

The statistical analysis was performed with Analyse-it 1.73 software (Analyse-it software Ltd., Leeds, UK). The level of significance was set at  $p = 0.05$ .

## RESULTS

Results reported in figures 3 and 4 show that at 30° SB graft reduced tibial displacement by about 5mm ( $p < 0.01$ ) in all compartments. Laxity on medial plateaus was not reduced by EA procedure ( $p = 0.741$ ), while on the lateral plateaus, the reduction was  $1.6 \pm 1.5$  mm ( $p = 0.015$ ). This results shows that the internal rotation of tibia, which is not controlled by SB graft, is reduced by EA procedure. (Fig. 3)

Figure 3. Tibial translation at 30° of flexion during Lachman test, measured in three different compartment. Legend; PRE: ACL deficient knee; SB: knee after single-bundle fixation; SB+EA: knee with single bundle and extra-articular tenodesis.

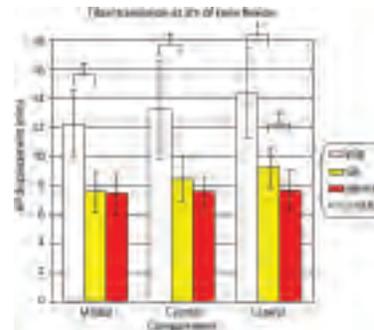


Figure 3.

At 90° of flexion SB graft reduced tibial displacement at tibial centre by  $3.2 \pm 1.1$  mm ( $p < 0.01$ ). Laxity on medial plateaus was reduced by SB graft of  $1.8 \pm 1.5$  mm ( $p = 0.038$ ), while on the lateral plateaus, the reduction was  $4.5 \pm 1.3$  mm ( $p > 0.001$ ). The SB graft was able to reduce internal rotation, reducing AP laxity 2.77 mm more in the lateral compartment than in the medial one ( $p > 0.001$ ). The additional extra-articular procedure causes a further significant reduction of knee laxity of about 1mm ( $p > 0.05$ ) in both compartments. (Fig. 4)

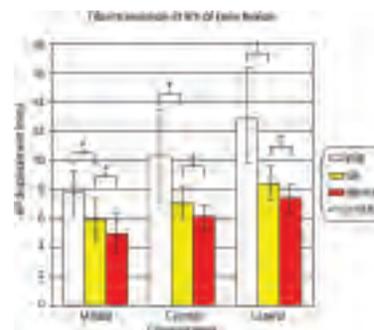


Figure 4. Tibial translation at 90° of flexion during Drawer test, measured in three different compartment. Legend; PRE: ACL deficient knee; SB: knee after single-bundle fixation; SB+EA: knee with single bundle and extra-articular tenodesis.

Figure 4.

## DISCUSSION

The goal of our study was to evaluate the role of a extra-articular procedure, added to a single-bundle graft, in controlling combined internal rotation of tibia during Lachman and Drawer test.

We have found that, despite the single bundle hamstring graft has a primary role in reducing statistically the knee laxity, an extra articular procedure, added to the graft, is effective in further controlling the laxity: At 30° the SB graft reduces antero-posterior translation while the extra-articular procedure controls internal rotation. On the contrary, at 90°, the SB graft reduces AP translation and also internal rotation, while the extra-articular procedure contributes in controlling tibial translation reducing laxity by 1mm in both compartments.

Our results confirm the in vitro studies of Engebresten et al. about subluxation of lateral plateaus prevention performed by the EA procedure. Moreover, the control of internal rotation may explain the reduction of "giving away" sensation reported by Jensen et al. and the good clinical outcome, observed in clinical studies, using this combined procedure.

Conclusions. Within the limitations of our methods our study demonstrated that in vivo the addition of an extra-articular procedure to single bundle ACL reconstruction may be effective in controlling tibial internal rotation during Lachman test and reduces AP laxity at 90° of flexion.

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# CURRENT CONCEPT OF ANATOMIC DOUBLE BUNDLE ANTERIOR CRUCIATE LIGAMENT RECONSTRUCTION

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## 1. HISTORY OF DOUBLE BUNDLE ACL RECONSTRUCTION

The anterior cruciate ligament (ACL) is functionally composed of two bundles, the anteromedial (AM) bundle and posterolateral (PL) bundle. An idea of double bundle ACL reconstruction with 2 tunnels in the femur and the tibia, respectively, was first described by Mott in 1983. In this early technical paper, no explanation concerning each tunnel location was made. In 1987, Zaricznyj reported on a double bundle procedure in which 2 tibial tunnels and one femoral tunnel were created. In 1994, a technical manual produced under the advice of Rosenberg and Graf displayed a few schematic drawings on an arthroscopically-assisted double bundle procedure using 2 femoral and 1 tibial tunnels. These pictures provided an impact to surgeons, although the manual was rarely cited as a scientific paper. In 1999, Muneta et al improved this procedure by creating two tunnels in the tibia. However, because they described that 2 femoral tunnels were created at the 10:30 and 11:30 (or 12:30 and 1:30) orientations, respectively, their procedure was different from the currently performed "anatomic" double bundle procedures. Hereafter, several technical papers for double bundle ACL reconstruction procedures were published. However, only a few clinical trials had been conducted to evaluate the double bundle procedures. Recently, Hamada et al and Adachi et al compared the clinical results between their single- and double bundle procedures, and showed that there were no statistically significant differences in subjective results or measured knee stability between the 2 procedures. However, because the authors described that the PL bundle was created at the 1:30 to 3:00 (or 9:00 to 11:30) o'clock orientation, there was a strong possibility that the tunnel position for the PL bundle reconstruction appeared not to be located at the best anatomic position according to the current knowledge.

In the 1980s and 1990s, the concept of double bundle ACL reconstruction appeared not to include anatomic reconstruction of the PL bundle, because no studies were conducted to clarify where the normal attachment of the PL bundle was on the lateral femoral condyle in a surgical visual field or to introduce a procedure in which a femoral tunnel was intentionally created through the center of the anatomical attachment of the PL bundle. In 2003, Yasuda et al reported a 2-year follow-up study on the first double bundle procedure in which 4 independent tunnels were intentionally created through the center of the 4 anatomical attachments of the PL and AM bundles, respectively, and they named this procedure "anatomic double bundle reconstruction". Their procedure included a newly

developed method to clinically identify the attachment of the PL bundle on the lateral femoral condyle in an arthroscopic visual field. This paper advanced the previous concept of double bundle reconstruction to the current concept of "anatomic" double bundle reconstruction. Hereafter, several technical papers on the anatomic double bundle ACL reconstruction have been reported to date. Their tunnel creation techniques are classified into a few types, the trans-tibial tunnel technique, the so called far-anteromedial portal technique, the double-incision outside-in technique, and so on. However, the essence of the anatomic double bundle procedure, which is to create 4 independent tunnels at the center of the 4 anatomical attachments of the AM and PL bundles, respectively, should be the same over the technical differences. Currently, the greatest criticism to anatomic double bundle procedures has been summarized in the following question: Are the clinical results of anatomic double bundle reconstruction better than the results of single-bundle reconstruction? Since Yasuda et al the first 2-year comparative results, 8 prospective clinical studies (Level I or II) that compared single- and anatomic double bundle reconstruction procedures have been available for review. However, the utility of anatomic double bundle reconstruction remains controversial. The purpose of this paper is to review how much evidence exists as to the benefits of double bundle ACL reconstruction at the present time.

## 2. WHAT IS THE FUNCTION OF THE NORMAL ACL?

The normal ACL is composed of the AM and PL bundles. Previous biomechanical studies have shown that the 2 bundles have different functions during knee flexion-extension motion. According to Kurosawa et al, the AM bundle is stretched in the full extension position, relaxed at 20 to 60 degrees of knee flexion, and again stretched in a flexion position of more than 90 degrees. The PL bundle is stretched more in the full extension position than the AM tunnel, while it is gradually relaxed during knee flexion and becomes slack in a flexion position of more than 90 degrees. In response to an anterior tibial load, Sakane et al reported that the magnitude of the in situ force in the PL bundle was larger than that in the AM bundle at knee flexion angles between 0 and 45 degrees, and Gabriel et al described that, under a combined rotatory load, the PL bundle is as important as the AM bundle, especially when the knee is in the near extension position. Recently, Zantop et al showed that isolated transection of the PL bundle significantly increases anterior tibial translation at 30° of knee flexion and combined rotation at 0° and 30°, compared with the intact knee and isolated resection of the anteromedial bundle. The ACL is the primary restraint to the tibial anterior translation, which is normally accompanied by a "coupled" tibial internal rotation. Both internal rotation and anterior translation are increased by rupture of the ACL, resulting in a large movement of the mobile lateral tibial plateau.

# CURRENT CONCEPTS

Can single-bundle ACL reconstruction restore normal stability of the knee with the AM and PL bundles? Clinical results after single-bundle ACL reconstruction procedures have been greatly improved over the past 20 years. Seventy to Eighty-five percent of patients who underwent single-bundle ACL reconstruction are evaluated as “normal” under the Internazionali Knee Documentation Committee (IKDC) evaluation criteria. However, all the “normal” knees evaluated with the IKDC criteria, which have anterior tibial translation of less than 3 mm, do not actually mean normal knees without any ACL injury. Recently, several in vivo kinetic studies have demonstrated that single-bundle ACL reconstruction procedures with either of the bone-patellar tendon and hamstring grafts cannot restore tibial rotation to normal levels not only during high-stress activities but also during low-stress activities, such as walking. Biomechanically, Woo et al reported that single-bundle reconstruction with either of the two grafts has no significant effects on rotatory instability due to ACL insufficiency. Clinically, therefore, it remains unknown whether single-bundle ACL reconstruction can successfully prohibit meniscus injury, cartilage injury, and osteoarthritis caused by ACL insufficiency. Further studies are needed to evaluate the long-term results of current single-bundle ACL reconstruction procedures.

### 3. WHAT IS ANATOMIC DOUBLE BUNDLE RECONSTRUCTION IN THE CLINICAL FIELD?

When surgeons intend to anatomically reconstruct the ACL with 2 bundles, it must be a common strategy to create 4 intraarticular tunnel outlets at the center of the 4 anatomic attachments of the AM and PL bundles, respectively. Previous anatomical studies reported that the normal PL bundle has a broad attachment on the lateral femoral condyle. In the 1990s, however, clinical procedures in which 4 intraarticular tunnel outlets were intentionally created at the center of the 4 anatomic attachments of the AM and PL bundles, respectively, were not reported, or few studies clarified where in a surgical visual field the normal attachment of the PL bundle was on the lateral femoral condyle. In 2003, Yasuda et al described that the femoral footprint of the main ACL fibers that should be clinically reconstructed in ACL reconstruction is oval-shaped with its long axis inclined toward the posterior direction by 30 degrees to the long axis of the femur. Recent anatomical studies have supported this observation. In addition, Mochizuki et al described that the previously observed wide attachment of the PL bundle might contain thin membranous soft tissues that surround the main fibers of the ACL.

To clinically perform anatomic double bundle ACL reconstruction, surgeons must identify each center of the 4 anatomic attachments of the AM and PL bundles. Commonly, it is difficult to clinically identify the center of the femoral attachment of the PL bundle, because there are few definite landmarks on the femur, although it is easy to

identify it in the cadaver knee. Therefore, each anatomic double bundle procedure should include a method to reproducibly identify the center of the femoral attachment of the PL bundle. Yasuda et al reported the following arthroscopic identification method: When the surgeon holds the tibia at 90 degrees of knee flexion, keeping the femur horizontal, a surgeon can imagine a superimposed circle on the margin of the posterior femoral condyle that contacts the tibial surface in the arthroscopic visual field. A surgeon also can imagine drawing a vertical line, which means a vertical diameter of the circle, through the contact point. The center of the attachment of the PLB is located approximately at the crossing point between this vertical line and the long axis of the ACL attachment. If the remnant of the ACL is not identified on the lateral condyle, the center of the attachment of the PLB can be determined as the point 5 - 8 mm anterior to the edge of the joint cartilage on an imaginary drawn vertical line. Further studies to validate this method or to develop other methods are needed in the near future.

### 4. ARE THE CLINICAL RESULTS OF ANATOMIC DOUBLE BUNDLE RECONSTRUCTION BETTER THAN THOSE OF SINGLE-BUNDLE RECONSTRUCTION?

Currently, 8 prospective clinical studies (Level I or II) have been conducted to compare single- and anatomic double bundle reconstruction procedures to date. In 2006, Yasuda et al reported the first prospective Level-II study to compare their anatomic double bundle procedure with their single-bundle and non-anatomic double bundle procedures using 72 patients. The side-to-side anterior laxity was significantly less in the anatomic double bundle group than in the single-bundle group (1.1 mm vs. 2.8 mm,  $P = .002$ ). Concerning the pivot-shift test, the anatomic double bundle group was significantly superior to the single-bundle group ( $P = .025$ ). There were no significant differences in the IKDC evaluation, the range of knee motion, and the muscle torque.

Hereafter, similar results have been reported in the following 6 studies. Aglietti et al compared 2 types of their anatomic double bundle procedures with their single-bundle procedure, using 75 patients (Level II). The two-incision anatomic double bundle group was significantly superior ( $P < .05$ ) to the single-bundle group not only in the anterior laxity (1.4 mm vs. 2.4 mm) and the pivot shift test, but also in the IKDC evaluation. There were no significant differences in the other clinical evaluations. Muneta et al conducted a randomized clinical study (Level I) using 68 patients, and reported that their anatomic double bundle group was significantly superior to the single-bundle group in the side-to-side anterior laxity (1.4 mm vs. 2.4 mm,  $P < .05$ ) and the pivot shift test. There were no significant differences between the 2 groups with regard to range of motion, thigh girth, muscle strength, Lysholm score, and

the IKDC evaluation. Most recently, Kondo et al reported a large prospective comparative study (Level II) using 328 patients. Their anatomic double bundle group was significantly superior to the single-bundle group in the side-to-side anterior laxity (1.2 mm vs. 2.5 mm,  $P < .0001$ ) and the pivot shift test. There were no significant differences in the other clinical evaluations and the rate of complications.

Yagi et al conducted a prospective randomized study (Level I) to compare their anatomic double bundle procedure with 2 types of single-bundle procedures, using 60 patients. Their electromagnetic measurement system demonstrated that their double bundle reconstruction was significantly better in pivot shift control of complex instability than their two single-bundle procedures ( $P < .05$ ). Jarvela conducted a prospective randomized study (Level I) to compare their single-bundle and anatomic double bundle procedures using 65 patients. The double bundle group was significantly better in the pivot shift test than the single-bundle group ( $P = .002$ ). Siebold et al conducted a randomized clinical study (Level I) using 70 patients. The side-to-side anterior knee laxity was 1.0 mm for their double bundle procedure and 1.6 mm for their single-bundle procedure ( $P = .054$ ) and the pivot shift test was negative in 97% for the former procedure and 71% for the latter procedure ( $P = .01$ ). The objective IKDC score was significantly higher for the former procedure than for the latter procedure ( $P < .0001$ ). Although there was no significant difference in anterior stability between the groups, none of the patients in the double bundle group had graft failure, while four patients in the single-bundle group had. In these 3 studies, there were no differences in the other clinical evaluations.

Thus, the anatomic double bundle reconstruction procedures appeared to restore better knee stability, specifically in the result of the pivot-shift test, than the single-bundle reconstruction procedures with the hamstring tendon graft. However, a prospective randomized study (Level I) conducted by Streich et al showed that there were no significant differences in all the clinical evaluations including the side-to-side anterior laxity and the pivot shift test between their anatomic double bundle and single-bundle procedures. Thus, the utility of anatomic double bundle reconstruction remains controversial.

## **5. DO BIOMECHANICAL STUDIES SUPPORT THE POSSIBLE SUPERIORITY OF ANATOMIC DOUBLE BUNDLE PROCEDURES IN KNEE STABILITY TO SINGLE-BUNDLE PROCEDURES?**

Concerning a comparison with the conventional single-bundle reconstruction, recently, a few biomechanical studies using a robotic manipulator compared the double bundle reconstruction, in which 2 anatomic tunnels and one tunnel were created in the femur and the tibia, respectively, with the conventional single-bundle ACL reconstruction, in which a thick bundle similar to the AM

bundle was created. According to Yagi et al, anterior tibial translation after anatomic double bundle reconstruction was significantly less than that after single-bundle reconstruction at full extension and 30° of knee flexion, although the translation values were significantly greater than those of the intact knee in both the reconstructions. Under combined rotatory loads of internal tibial torque and valgus torque, the coupled anterior tibial translation after the anatomic reconstruction was significantly less than that of the single-bundle reconstruction at both 15° and 30° of flexion angles, although the translation values were significantly greater than those of the intact knee in both the reconstructions. They concluded that the anatomic double bundle reconstruction produces a better biomechanical outcome, especially during rotatory loads, compared with the conventional single-bundle reconstruction. Petersen et al (50) showed that anatomic reconstruction with two tibial tunnels produced a better biomechanical outcome concerning both the anterior tibial translation and the in situ force at 0° and 30° of flexion, under both a 134-N anterior load and an internal rotatory and valgus torque applied to the tibia using a robotic manipulator.

Yamamoto et al compared the anatomic double bundle reconstruction with the laterally placed single-bundle reconstruction, in which a femoral tunnel was placed at the center of the anatomical attachment of the PL bundle. The anterior tibial translation in the anatomical double bundle reconstruction is significantly less than that in the laterally placed single-bundle reconstruction at 60 and 90 degrees of knee flexion ( $P < .05$ ), although there were no significant differences at full extension and 15 and 30 degrees of knee flexion. However, it should be noted that the laterally placed single-bundle reconstruction has not been recommended by any orthopaedic surgeons in the clinical field.

Can 2 bundles reconstructed with clinical procedures have nearly normal functions as shown in the biomechanical studies with cadavers? A few intraoperative measurement studies have been reported using a navigation system or a specially designed system to measure graft tension. These studies have suggested that the kinematics of the knee and the force distribution between the two grafts in the anatomical two-bundle technique were similar to those observed in the above-described studies with the cadaver knees. Recently, Yasuda et al conducted a Level-I clinical study using 30 patients. Two suture anchors with a polyester suture were firmly screwed into the center of the anatomical attachment of the AM and PL bundles on the femur, respectively, and each graft tension was measured with a strain gauge-type tensiometer attached at the end of the suture under 2 conditions of initial tension. The tension-versus-flexion curves of the 2 sutures, which mimicked the AM and PL grafts reconstructed clinically with the anatomic double bundle ACL reconstruction procedure, were significantly different in the tension values. The maximal internal rotation of the tibia significantly increased the tension on both the AM and PL suture grafts at knee flexion angles of less than 60 degrees.

# CURRENT CONCEPTS

Thus, the clinical anatomic double bundle procedures can reconstruct the knee having biomechanical functions closer to the normal range than single-bundle reconstruction, if surgeons have sufficient skills to precisely perform the appropriately evaluated procedures.

## 6. CONCLUSION

The anatomic double bundle ACL reconstruction procedures appear to have biomechanical benefits, at least, immediately after surgery. From a clinical viewpoint, however, the utility of anatomic double bundle reconstruction has been controversial, although the recent Level-I and II studies have reported better knee stability after anatomic double bundle reconstruction. When we intend to compare the clinical results among the previously reported studies, we have found some problems: First, all studies did not clearly show the 3-dimensional tunnel positions of the 4 tunnels created in their surgery, although the authors described that they performed “anatomic” reconstruction. Secondly, there are so many technical variations among the reported studies in graft fashioning, graft tensioning (angle of knee flexion, magnitude of initial tension, and etc), graft fixing (artificial devices, surgical techniques, and etc), and postoperative management. Further large-sized clinical studies are needed to evaluate the utility of anatomic double bundle reconstruction, while we should newly establish some precise description systems to document the above-described critical points actually performed in each surgical study. In addition, we should establish an advanced system over the simple anterior laxity measurement to evaluate the clinical results after ACL reconstruction. For example, it is needed to develop quantitative measurement tools for the pivot shift test, clinically available devices to measure in vivo kinematics during athletic activities, clinical evaluation criteria for the secondary injuries of the meniscus and the cartilage that occur within 10 years after ACL reconstruction, and so on. Efforts to establish a better evaluation system will advance ACL reconstruction surgery in the near future.

Full article and references also available online at [www.isakos.com](http://www.isakos.com).

## ISAKOS IN AFRICA

**Advanced ACL Meeting  
Sports Science Institute, Cape Town, South Africa**

The first ISAKOS sponsored instructional course was held in Cape Town, South Africa in August 2007. The congress chairman was Dr Willem van der Merwe, President of the South Africa Knee Society.

The invited International faculty consisted of Dr's Freddie Fu, James Lubowitz, Jason Koh and Phillipe Colombet.

The meeting was structured around interactive case studies and cadaver labs.

Attendees were from 5 sub-Saharan African countries including Mauritius, and the United Arab Emirates, Malaysia and the Indian subcontinent.

The first day program for 74 intermediate level surgeons covered comprehensive history taking and examination, and decision-making in knee surgery. Cadaver lab work included meniscal and chondral surgery and single bundle ACL reconstructions.

The advanced course over the following two days for 75 delegates covered controversies in arthroscopic knee surgery and an opportunity to perform anatomic double bundle ACL reconstructions in the lab.

Keynote lectures included “Research and Publication” by James Lubowitz, “Anatomic ACL from primate to man” by Freddie Fu and “The future of ACL” surgery by Dr's Koh and Colombet.

Due to the success of this meeting we are hoping to follow this up with course in East Africa in 2009.



Fig 2. Dr Freddie Fu leading the scrub tech's in a “double bundle dance” routine.



## ISAKOS IN POLAND

Robert Śmigieński, Polish Sport Traumatology Society

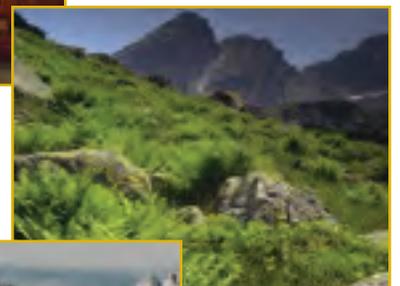
Poland lies in the heart of Europe - the centre of the continent is right here. The earliest signs of human life in Europe can be found in Poland and date back to 8 thousand years BC. Today, Poland, with a population of about 40 million people, accounts for 5.3 percent of the population of Europe and approximately 0.65 percent of the world's population

The country of Poland contains everything a visitor or resident could want, from alpine mountains to wide beaches, clean lakes, deep forests, world-class historic monuments, and friendly people. The climate is temperate, and the people warm and hospitable. Polish cities with a thousand-year history invite their visitors to encounter culture, and Poland's villages and small towns offer the opportunity to get away from the bustle of modern life. All of this comes with a backdrop of breathtaking natural landscapes, because Poland's greatest attraction is nature - wild, untouched, more diverse than in most countries either in Europe or around the world, and easily accessible.

Until recently, there were not many Polish members of ISAKOS for a variety of reasons. Language presents a barrier, as not all Polish orthopedic surgeons speak fluent English. Also, the membership fee is expensive for Polish conditions, and there are not many ISAKOS approved educational events organized in Poland. However, this began to change last year during the Congress of the Polish Sport Traumatology Society, a society with almost 600 members. Society leadership officially introduced ISAKOS to Poland's sport orthopedic surgeons through use of an ISAKOS marketing booth, and membership sheets and information about ISAKOS translated into Polish and Russian.

In Poland, there are a lot of young orthopedic surgeons willing to learn and improve their knowledge in arthroscopy, knee surgery and orthopedic sports medicine. Almost all new techniques are gradually implemented in Polish clinics, including double bundle ACL reconstruction, stem cells application, cartilage surgery including autologous chondrocyte implantation, and many, many others.

For a Polish medical practitioner, easy access to high level educational courses, symposium and congresses is still an issue, from both a linguistic and financial point. Therefore, there is a great challenge for ISAKOS to become very active in my country, organizing events on Polish territory with simultaneous translation and to be very well recognized with Polish orthopedic surgeons. We strongly believe that ISAKOS will be present at all educational and scientific events during the next years.



# ISAKOS APPROVED COURSES IN REVIEW

## ISAKOS, AANA & CSSM: Surgical Skills and Hands On Cadaver Workshop Shanghai, China

May 15–17, 2008



I'd like to extend my sincere appreciation to all faculties, leaders of Chinese Society of Sports Medicine (CSSM) and Chinese Society of Orthopaedic Surgery for Arthroscopy (CSOSA) counterparts and friends for your active participation and support! "The First ISAKOS-AANA-CMA Arthroscopy Conference & the 5th Shanghai International Forum &

National Course on Arthroscopy and Orthopedics Sports Medicine" was successfully held in Pudong, Shanghai on May 15–17, 2008.

Twenty five international faculty members presented thirty-nine special lectures and twelve live surgical demonstrations on cadavers, covering the six major joints including knee, shoulder, hip, elbow, wrist and ankle. 120 surgeons participated in two, twenty-station surgical labs for additional training.

Attendance at the meeting was slightly disrupted as faculty and registrants from the southwest regions of China were called to assist in the aftermath of the earthquake in Sichuan, China. Despite this, we still had 315 representatives present.

The conference was a complete success and had great academic and social influence, which all the guests, participants and supervisors appreciated. The authority of Chinese Medical Association (CMA) paid great attention to it. Dr. Liu Yan Fei, the leader of CMA came to Shanghai and addressed on the opening ceremony and wished the success of the conference. Also, as an organizing unit, Huashan Hospital of Fudan University contributed greatly to the success of the conference.

As an internationally leading organization in arthroscopy, knee surgery and orthopaedic sports medicine, the ISAKOS Executive Committee placed this May Shanghai meeting as the most important workshop event scheduled for 2008. In support of this conference, ISAKOS donated twelve sets of workshop demonstration equipments to the Department of Sports Medicine of Huashan Hospital, selected and arranged for eighteen top-level international sports surgical experts to give lectures and surgical demonstrations in China. The faculty gave hands-on instructions to participants for arthroscopy manipulation, which brought fresh ideas to the counterparts in China. ISAKOS also provided a special opportunity for meeting attendees to join ISAKOS.

The directors from CMA in Beijing spoke highly about this conference, saying "it creates many first time for CMA".

Dr. Gary Poehling, former ISAKOS President and current Editor in Chief of *Arthroscopy: The Journal of Arthroscopic and Related Surgery*, said of the conference: "Dr. Chen Shiyi and his team made the recent meeting such a success.

All the details were looked after and nothing was too much work. The answer was always yes! The faculty felt appreciated and treated. The leadership skills and work ethic were impressive. Dr. Chen also coordinated well with ISAKOS Executive Director, Michele Johnson, and her staff to have a superior outcome. We will look back on this as a very important meeting in years to come."

On behalf of the ISAKOS Executive Committee, Michele Johnson says: "This meeting was very meaningful as it was the first time we have collaborated with AANA on an educational event. ISAKOS looks forward to an opportunity in the future to again partner with CSSM and Huashan Hospital for another meeting. I want to personally thank CSSM and congratulate you for an absolutely extraordinary and successful meeting. The feedback and enthusiasm from the faculty has been very positive. You, the CSSM leadership, your faculty and hospital staff were very helpful and conscience in all of the planning and execution of the lectures, workshops and social activities."

Other comments from faculty members and staff included: "This meeting is very well-organized. It is considered as a top-level one in the world in terms of the professionalism of the international lecturers, staffs, operation equipments, cadaver samples, academic level, and high reception standard, which is ranked the best session among the 76 ISAKOS approved education and training centers over the world."

Participants also viewed the workshop favorably, saying, "This is the most exciting and fruitful session in the personal occupational life, also a top-level operation demonstration and hand-on surgical technique workshop. It's really the most satisfying educational course!"

All those compliments far exceeded our expectation.

## CORPORATE SUPPORTERS

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Sawbones  
Smith & Nephew  
Stryker

# ISAKOS APPROVED COURSES IN REVIEW

This meeting marked four “first time” events:

- The first collaboration of two educational authorities – the International Society of Arthroscopy, Knee Surgery, Orthopaedic Sports Medicine (ISAKOS) and the Arthroscopic Association of North America (AANA),
- The first international top-level sports trauma and arthroscopy surgical academic conference and hand-on surgical technique advanced workshop to be held in mainland China;
- The first collaboration of two major academic organizations under the Chinese Medical Association - Sports Medicine and Orthopaedics - on a huge surgical skills demonstration course in Arthroscopic surgery.
- And the first time that four major medical academic groups from China and abroad held a top-level international arthroscopy and sports surgical session to improve the prevention and treatment of sports trauma in preparation for the 2008 Beijing Olympic Games.

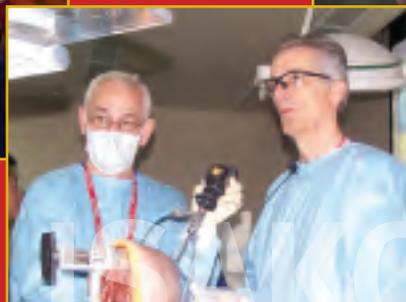
During the conference, the Sports Medicine Department of Huashan Hospital, affiliated to Fudan University, was accredited as an ISAKOS Approved Teaching Center. ISAKOS Teaching Centers are known internationally for their “Advancement of Education, Research and Patient

Care in the Field of Arthroscopy & Orthopaedic Sports Medicine”. As the first “sports trauma and arthroscopy surgery department” in mainland China to get approved and certificated from ISAKOS, the Sports Medicine Department of Huashan Hospital, Fudan University has been involved in the great family of international standard, which ensure us to get the support and recognition from ISAKOS in the field of international academic conferences, surgical skill course, specialist and medical skill training, which connected us to the international education network. It also show that the techniques of arthroscopy surgery at Huashan hospital have kept the same step with the international level, which will be definitely in favor of Chinese people.

In the end, I'd like to extend my sincere gratefulness to all of the attendees and sponsors again. Let us progress and improve together!

## **Shiyi Chen, MD, PhD.**

*Executive President of the Organizing Committee  
Vice President, Chinese Society of Sports Medicine, CMA  
Professor and Chairman, Fudan University Sports Medicine Centre  
CMO for F1, MotoGP, Olympic Game Football, in China*



## **SHANGHAI MEETING REPORT**

### **From Course Chair, Dr. Gary Poehling**

The first ISAKOS-AANA-CSSM Surgical Skills and Hands on Cadaver Workshop focusing on arthroscopy and orthopedic sports medicine was held on May 15–17, 2008 in Shanghai, China. This meeting was the culmination of 18 months of truly international collaboration. The course combined internationally renowned faculty, as well as the most advanced techniques to teach complex skills related to arthroscopic procedures.

This meeting fulfilled the Mission Statement of ISAKOS to “advance the worldwide exchange and dissemination of education, research and patient care in arthroscopy, knee surgery and orthopaedic sports medicine”. This mission

was accomplished through cooperative effort with the Arthroscopy Association of North America, as well as *Arthroscopy: The Journal of Arthroscopic and Related Surgery*. We are also pleased to announce that ISAKOS Membership was offered to attendees of the meeting, and 49 people will be continuing their education by receiving an annual subscription to the Journal.

From a personal point of view, this has been one of the more satisfying and rewarding experiences of my career. Not only were the participants and the faculty engaged, but also the support staff on both sides of the Pacific could not have been more accommodating. It all started when I met Dr. Xu in November of 2006. At the time he was President of the Huashan Hospital which was being built in Pudong. Dr. Xu has since become the Minister of Health for all of Shanghai.

## CHALLENGES & COMPLICATIONS WITH COMPUTER ASSISTED SURGERY IN TOTAL KNEE ARTHROPLASTY



**PETER BONUTTI, MD, FACS**

Bonutti Clinic  
Effingham, Illinois, USA

### ABSTRACT

Computer Assisted Surgery (CAS) for Total Knee Arthroplasty (TKA) has been promoted to improve prosthetic alignment and soft tissue balancing, and theoretically improve

clinical results. Like Minimally Invasive Surgery (MIS), there is a controversy concerning the real benefits of CAS for TKA. CAS has been found in numerous Level I studies to improve the radiographic alignment of TKA in regards to the mechanical axis, femoral component position, tibial slope, and tibial alignment. (Matziolis, Chin, Chauhan, Ensini, Decking) All studies have shown that CAS requires more operative time and more expensive surgical equipment. Therefore, to objectively assess the benefit of CAS, one must look at issues: 1) Alignment and proven implant longevity. 2) Clinical benefits. 3) Learning curve. 4) Complications. 5) Value - Cost versus Benefit.

1. Advocates of CAS have proposed that improving the accuracy of TKA will improve the overall implant survivorship. Current TKA with conventional instrumentation at greater than 10 year followup has over 90% survivorship. All CAS literature provides only short term, less than 5 year followup, on clinical survivorship. Long term improved survivorship remains theoretical at this time.

CAS publications suggest if one can improve the alignment relative to the "sweet spot" - optimal position on the mechanical axis, that survivorship will be improved. Pagnano (AAOS Study 2008) found the majority of the literature on limb alignment and long term survivorship is based on standard short leg not long leg weightbearing x-rays, this raises some question about what optimal mechanical axis should be. Although this study has not yet been published, it does bring into question what really is the "optimal" alignment for TKA survivorship. Can we extrapolate short term into long term results? I would propose that we at least need midterm 5-10 year data before we can objectively state there is better alignment provided by Computer Navigation will definitely equate to better survivorship.

2. Clinical Results - Ullrich, in a Comprehensive Review in Peer Review Literature on CAS TKA, has failed to identify any article which proves clinical benefit to knees implanted with CAS over traditional instruments. Furthermore, a recent study by Spencer found at two years followup, although CAS knees may have better alignment, there was no proven clinical benefits.
3. Learning curve exists for any new instrument or technology. The greater the complexity, the longer the

potential for learning curve. With CAS, some have suggested that learning curve may be short term, 10 cases or less with improved software and improved system. However, Bonutti (AAOS 2008) suggested in a community practice, CAS learning curve can be longer than expected, up to 80 cases. Low volume surgeons or those without regular access to company representatives may find early adaptation challenging.

4. Complications - There has been an assumption that CAS does not have additional complications. All studies have shown there is an increased operative time with CAS (9-37 minutes). With increased operative time, also may potentially increase your risk for infection.

Catastrophic complications do exist. Position of metallic trackers embedded into the bone may increase the potential for bleeding, pain, and/or fractures. To date, there are five papers reporting fractures through tracker sites with catastrophic complications. Our recent paper identified two femoral fractures through the tracker sites which required intramedullary fixation for repair. (Bonutti)

- Ossendorf, Knee Journal, Oct. 2006

- Tria, Am J Ortho Supp., July 2006

- Seon, Knee Surg Sports Traumatol, Jan. 2007

- Jung, JBJS Am, Oct. 2007

- Bonutti, Clin Ortho, Accepted Jan. 2008



5. Software and hardware cost, and reimbursement models vary from country to country. In the United States CAS usually is purchased by the hospital. Software upgrades must also be purchased. The trackers are single use. One must add the increased anesthesia/OR time to the overall cost. At our hospital, the navigation system with upgrade cost over \$329,000 versus conventional instrumentation at \$49,000. The disposables, OR time, and anesthesia add an additional \$925 in cost per surgical procedure. There is a substantial cost in the utilization of CAS for TKA, at least in the US market.

CAS is clearly an important technology for the future of TKA. Surgeons should be aware of advantages, well documented in the literature, as well as some of the challenges of CAS with TKA.

The literature does not prove increased longevity, reduced complication, or clinical benefit. The literature does suggest there is increased operative time, cost, and a learning curve, with the potential for significant complications. Overall, CAS has a definitive placement in the future of knee arthroplasty. It's role is evolving, but these issues must be addressed before there is widespread utilization of CAS with TKA.

Full article and references also available online at [www.isakos.com](http://www.isakos.com).

# ISAKOS APPROVED COURSES IN REVIEW

## SHANGHAI MEETING REPORT *(cont.)*

Dr. Xu introduced me to Dr. Shiyi Chen and suggested that an international meeting to promote advanced techniques in arthroscopy would be welcome in Shanghai. Dr. Chen went to the Chinese Medical Association, and I went to AANA and ISAKOS for support. There was no hesitation on anyone's part. The day to day decision making was led by Dr. Jiwu Chen in Shanghai and ISAKOS Executive Director, Michele Johnson. The capacity to engineer a world class course was evident to the entire faculty. The facilities were state of the art, and included digital video technology. The lab stations were new and well equipped, and the Huashan Hospital staff made the faculty feel right at home.

I look forward to continuing to grow the collaborations and very positive relationships that were forged during this process.

### Gary G Poehling MD

*Editor in Chief Journal of Arthroscopy*  
ISAKOS Past President, 1997-1999  
Professor of Orthopedics  
Wake Forest University Medical Center  
Winston-Salem, NC, USA



## PANTHER GLOBAL SUMMIT 2008

### Freddie Fu, MD

The Department of Orthopedic Surgery at the University of Pittsburgh was honored to organize the "Panther Global Summit 2008: Anatomic Double Bundle ACL Reconstruction" in Pittsburgh, Pennsylvania from February 28th to March 1st, 2008. This was the first international symposium to focus only on the topic of anatomic double bundle ACL reconstruction, which is one of the fastest evolving topics in sports medicine. Speakers from North and South America, Europe, Asia, Africa and Australia participated and gave a global perspective of anatomic double bundle ACL reconstruction.

Double bundle ACL reconstruction has been a much discussed topic for the last couple of years. Although basic science evidence and preliminary clinical outcomes data support the advantage of this innovative technique, most of the surgeons still have concerns about the need for and methods to anatomically reconstruct both bundles of the ACL. In addition, the technique has been evolving quickly in different countries and medical centers. Thus, the Panther Global Summit 2008 was organized to share surgical techniques and clinical experiences, as well as to present new basic science results.

The faculty included experts in ACL reconstruction from United States, Brazil, England, France, Germany, Italy, South Africa and Japan. The expertise of the faculty provided for a very high scientific standard that addressed anatomy of the ACL, biomechanics and kinematics of the knee, assessing clinical outcome with an emphasis on measuring rotation, global perspective of method to perform anatomic double bundle ACL reconstruction, pitfall and complications of double bundle

ACL reconstruction, augmentation of the anteromedial or posterolateral bundle and revision ACL reconstruction using the double bundle concept. Ample time was provided for panel discussions and questions from the audience. Live surgical demonstrations, illustrating the concepts of anatomic double bundle ACL reconstruction were conducted by Drs. Fu and Harner. Before and after the conference, attendees had the opportunity to participate in a cadaveric surgical workshop to learn and practice the skills necessary for anatomic double bundle ACL reconstruction.



More than 200 individuals from around the world attended the Summit. This included individuals from the United States, China, Japan, Korea, Poland, Germany, Italy, United Kingdom, Spain, Mexico, Slovenia, and Greece. The high scientific quality of the lectures was acknowledged by both the attendees and the speakers and the open, friendly and informal panel discussions were greatly appreciated. Organizers would like to express special thanks to all of the faculty and participants who made this meeting successful. Additionally, the organizers are grateful to ISAKOS for their active support of the meeting.

It was my pleasure and a great honor to serve as the Chairman of the Organizing Committee for the Panther Global Summit. I would like to express many thanks to all of my colleagues and to everyone who contributed to the organization of this successful meeting as well as to all our sponsors for their support.

# UPCOMING ISAKOS APPROVED COURSES

## ACL STUDY GROUP

**James Lubowitz, MD**

**John Bergfeld, MD**

The ACL Study Group (SG) convened in March 2008 in snowy Engelberg, Switzerland. In attendance were Stephen Howell, President; Nik Friederich, Vice-President; Julian Feller, Second Vice-President; John Bergfeld, Executive Director; John Feagin, Founder; John Campbell, Membership Chair; Roger Larson, Program Chair; and ACL Study Group Traveling Scientist Martha Murray as well as surgeons and scientists from many countries. Many of the participants are ISAKOS members including ISAKOS Past President 2005-2007 John Bergfeld, ISAKOS 2nd Vice President Moises Cohen, ISAKOS Arthroscopy Committee Chairman Stephen Howell, and ISAKOS Newsletter Editor James Lubowitz.

Meeting highlights, in addition to the presentation of 64 original scientific papers, included featured symposia on the following subjects:

- The next generation of ACL Surgery: Biologic Enhancements of Grafts and Repairs
- New Technology for Guidance and Laxity Evaluation—What is it Telling Us? What Does it Mean? Does it Help?
- ACL Induced Osteoarthritis—From the Bench to the Bedside
- Failed ACL—Done Well: Causes of Failure After the Well Performed Reconstruction.

By debating controversial issues, and combining the experience of experts offering clinical interest and expertise with invitation of eight accomplished, young, and up-and-coming scientists to complete the program, the ACL Study Group forms an international organization whose meeting serves to stimulate both research and clinical understanding and advancement at the fore of the epidemic of ACL rupture. Contributions from the ACL SG including research stimulated by the meeting will no doubt appear in future issues of *Arthroscopy: The Journal of Arthroscopic and Related Surgery*, and on the program at the upcoming ISAKOS Biennial Congress.

## FIRST ANNUAL ASPETAR ARABIAN GULF SPORTS MEDICINE MEETING

**November 19–20, 2008**

**Aspetar Orthopaedic and Sports Medicine Hospital  
Doha, Qatar**

Abstracts are currently being accepted for the First Annual Aspetar Arabian Gulf Sports Medicine Meeting to be held at Aspetar Orthopaedic and Sports Medicine Hospital in Doha, Qatar on November 19 & 20, 2008. Submit your research for inclusion in this first meeting in the Middle East to discuss and promote sports medicine and orthopaedic surgery. Delegates from the region as well as internationally will be in attendance.

Abstracts should be submitted to [isakos-gulf@aspetar.com](mailto:isakos-gulf@aspetar.com) no later than September 15, 2008. For further information on the conference please contact [isakosgulf-reg@aspetar.com](mailto:isakosgulf-reg@aspetar.com).

## ARTHROSCOPY ASSOCIATION OF NORTH AMERICA 27<sup>TH</sup> FALL COURSE

**November 20–22, 2008**

**J.W. Marriott Desert Ridge  
Phoenix, Arizona, USA**

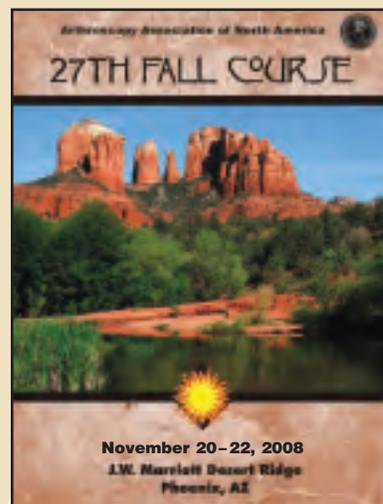


The Arthroscopy Association of North America (AANA) invites you to attend the 27<sup>th</sup> Annual AANA Fall Course in Phoenix, Arizona. Registrants at the AANA Fall Course have the opportunity to hear about cutting edge techniques using the newest technology, observe these techniques as demonstrated by expert faculty on

cadavers during Focus Demonstrations, then apply the knowledge gained by participating in hands-on cadaveric laboratories and mini fellowships, as well as dry labs.

The Fall Course offers Shoulder, Knee, Hip, Wrist & Elbow, and Foot & Ankle education.

To learn more and register on-line visit: [www.aana.org](http://www.aana.org).



# UPCOMING ISAKOS APPROVED COURSES



## ISAKOS APPROVED COURSE

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Apply today!

### X PRE-CONGRESS OF THE INTERNATIONAL ARTHROSCOPY AND SPORTS MEDICINE

Buenos Aires University  
Buenos Aires, Argentina  
May 6, 2008

**For more information, please contact:**

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Fax: +54 11 4811 2389  
[www.artroscopia.com.ar](http://www.artroscopia.com.ar)

### X CONGRESS OF THE INTERNATIONAL ARTHROSCOPY AND SPORTS MEDICINE

Hilton Buenos Aires  
Buenos Aires, Argentina  
May 7-11, 2008

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### SHOULDER ARTHROSCOPY ADVANCED NATIONAL COURSE

University of Barcelona Anatomy Lab  
Barcelona, SPAIN  
May 29-30, 2008

**For more information, please contact:**

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[www.smith-nephew.com](http://www.smith-nephew.com)

### II SLARD CONGRESS - XIII AMECRA CONGRESS SOCIEDAD LATINOAMERICANA DE ARTROSCOPIA, RODILLA Y TRAUMATOLOGIA DEPORTIVA

Hilton Cancun Golf and Spa Resort  
Cancun, Mexico  
June 4-7, 2008

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Fax: +54 11 4801 7703  
[www.slard.org](http://www.slard.org)

### INTERNATIONAL FORUM ON TENNIS MEDICINE AND SCIENCE

Blue Tree  
Sao Paulo, BRAZIL  
June 13-15, 2008

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Fax: +55 11 55495581  
[www.neoesporte.com.br](http://www.neoesporte.com.br)

### COMBINED CONGRESS OF JOSKAS 2008

Grand Prince New Takanawa Hotel  
Tokyo, JAPAN  
June 13-14, 2008

**For further information, please contact:**

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Fax: +81 3 5803 0266  
<http://www.joskas08.umin.jp/>

### DUTCH SHOULDER, ELBOW AND KNEE ARTHROSCOPY COURSE

Utrecht University, Anatomy Department,  
The Netherlands  
Utrecht, NETHERLANDS  
June 24, 2008

**For further information, please contact:**

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[shoulder-elbow2008@xs4all.nl](mailto:shoulder-elbow2008@xs4all.nl)  
Tel: +31 30 276 9174  
Fax: +31 30 276 9251  
[www.shoulder-elbow.nl](http://www.shoulder-elbow.nl)

### 4TH BASEL INTERNATIONAL KNEE CONGRESS & INSTRUCTIONAL COURSE

Congress Center  
Basel, Switzerland  
June 29-July 2, 2008

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[www.ortho-brudeshalz.ch.knee2008](http://www.ortho-brudeshalz.ch.knee2008)

### 2008 LIGAMENT RECONSTRUCTION SEMINAR & LIVE SURGERY SAPPORO

Hokkaido University Faculty House  
"Enreisou"  
Sapporo, JAPAN  
July 24-25, 2008

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[www.med.hokudai.ac.jp/~medtec-w/](http://www.med.hokudai.ac.jp/~medtec-w/)

### 13ÈMES JOURNÉES LYONNAISES DE CHIRURGIE DU GENOU- LE GENOU ET LE SPORT

Centre de Congrès de Lyon  
Lyon, FRANCE  
October 9-11, 2008

**For further information, please contact:**

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Tel: +33 4 72 07 62 22  
Fax: +33 4 72 07 06 66  
[www.lyon-genou.com](http://www.lyon-genou.com)

### 9TH TURKISH SPORTS TRAUMATOLOGY, ARTHROSCOPY AND KNEE SURGERY CONGRESS

LUTFI KIRDAR CONGRESS AND  
EXHIBITION CENTER  
ISTANBUL, TURKEY  
October 14-18, 2008

**For further information, please contact:**

Prof. Dr. Isik Akgun  
[artroskopi2008@figur.net](mailto:artroskopi2008@figur.net)  
Tel: +90 212 3814637  
Fax: +90 212 2586078  
[www.turkartroskopi2008.org](http://www.turkartroskopi2008.org)

### 37TH SEVERANCE FRESH CADAVER KNEE ARTHROSCOPY WORKSHOP

Yonsei University Health System  
Seoul, SOUTH KOREA  
November 8, 2008

**For further information, please contact:**

Kyung-Soo Oh  
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Tel: +82 2 2228 5679  
Fax: +82 2 363 6248  
[www.severanscopy.com](http://www.severanscopy.com)

### 38TH SEVERANCE FRESH CADAVER SHOULDER ARTHROSCOPY WORKSHOP

Yonsei University Health System  
Seoul, SOUTH KOREA  
November 15, 2008

**For further information, please contact:**

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[severanscopy@yuhs.ac](mailto:severanscopy@yuhs.ac)  
Tel: +82 2 2228 5679  
Fax: +82 2 363 6248  
[www.severanscopy.com](http://www.severanscopy.com)

### EFOST 2008: 5TH MEETING OF THE EUROPEAN FEDERATION OF NATIONAL ASSOCIATIONS OF ORTHOPAEDIC TRAUMATOLOGY

Sheraton Hotel  
Beach Antalya, Turkey  
November 26-30, 2008

**For further information, please contact:**

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