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Department of Orthopaedics & Traumatology

Queen Mary Hospital

The University of Hong Kong Medical Centre

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Message from the Editorial Board

As usual, we finished the year with a bang. We had great success at the 30th Hong Kong Orthopaedic Association Annual Congress, Occupational Orthopaedics, and had the 1st Basic Science and Anatomy Course in Orthopaedics & Traumatology for FRCS (Orth) Examination which opened to wide acclaim. For the other events that took place throughout the year, you're welcome to peruse our previous issues which are available at our website (http://www.hku.hk/ortho/ortho/)!

Despite the cold weather, people in Hong Kong remain active in multiple sports, including soccer, jogging, golf, tennis, and other indoor sports, like ping pong, badminton and squash. Injuries though undesirable may be a part of these activities, and we have a series of articles in this issue which may shed some light on their management. We are also very happy to have Dr. Yau Wai Pan, who heads our Sports Division, lend some insight into the internal workings of someone who is a passionate doctor, researcher, and teacher.

So just sit back and enjoy reading this issue in front of your fireplace (heater) in this cold winter season!

Merry Christmas & Happy New Year!

"Doc! My knee hurts after a twisting injury during a soccer game!"

Knee injury after a soccer game

Dr. August Fok

18 years old boy was presented with acute knee pain, associated with generalized swelling after a twisting injury during a soccer game…

Possible diagnoses

The knee joint consists of several important structures that may be damaged during the sports injury and may cause acute pain and swelling. They include bone, articular cartilage, menisci and ligaments. In the order of "probability" (from highest – lowest), the patient may be suffering from:

1. anterior cruciate ligament tear
2. osteochondral fracture
3. patellar dislocation
4. meniscal tear
5. other ligamentous injuries, e.g. posterior cruciate ligament, collateral ligaments, etc.

Acute management

R- Rest: stop the soccer game and visit a doctor immediately;
I- Ice: cold temperature by ice bags, cold packs or even a bag of frozen peas can help to relieve pain and to decrease knee swelling as it reduces the blood flow to the area;
C- Compression: put on some bandage around the knee, but never too tight as the blood circulation will become congested and lead to more swelling;
E- Elevation: raise the knee above the level of the heart, e.g. put 2 pillows underneath the ankle when lying down.

The doctor will perform physical examination for the patient to evaluate the range of movement of the knee, tender spot(s) and presence of ligamentous laxity through different tests, e.g. Lachman test, drawer test, valgus and varus stress tests. X-ray of the knee will be taken to rule out any fracture or dislocation.

A knee tap can be very useful in terms of diagnosis as it provides important clues to the underlying pathology of the knee effusion. It can also be therapeutic as it relieves the distending discomfort by the swollen knee. After sterilizing the skin, the doctor will put a needle to the knee joint, and aspirate the fluid collected within. If the fluid is blood, it has been reported that there is a 72% chance that the anterior cruciate ligament is torn. Presence of fat globules in the fluid may suggest that there is a fracture inside the knee joint.

ACL tear (above) and meniscal tear (below)

Follow-up management

The doctor will repeat the physical examination for the patient after 48 hours from injury. Most of the time, clinical symptoms reported by the patient and the physical signs are informative and sufficient to make the final diagnosis. If the definitive diagnosis is in doubt, the doctor may arrange an MRI for the patient, though it is not

always necessary. MRI allows the doctor to inspect the soft tissues of the knee, including various ligaments, cartilage, and menisci. It may also show up subtle fracture, which cannot be seen in the X-ray. MRI must be utilized together with patient's injury history, findings of physical examination and X-rays in order to establish an appropriate treatment plan.

Treatment

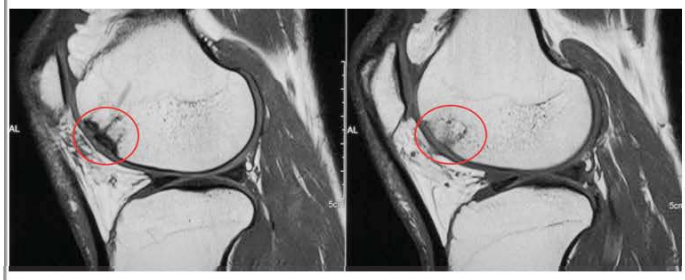
The doctor may prescribe drugs including non-steroidal anti-inflammatory medication to reduce the knee pain and inflammation. Immobilization by means of a plaster or brace may be required in patella dislocation or collateral ligament tear. Physiotherapy is also helpful in reducing the knee pain and swelling, improving the knee range and muscle strength. Surgery may be considered if there is persistent pain, instability or disturbance in daily or sports activity in the case of meniscal or ligamentous injury. However, if the knee is locked, which means the knee cannot be fully straightened by whatever means, urgent surgery will be indicated. Locked knee can be caused by a meniscal tear, small fracture fragment or the torn stump of anterior cruciate ligament being lodged inside the knee joint. Key-hole surgery (arthroscopy) will be needed to clean away the culprits that caused the blocking. Otherwise, the knee may develop irreversible contracture.

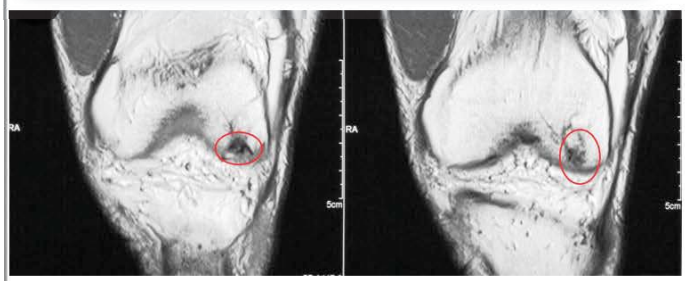
Cutting Edge Development

Advances in Cartilage Surgery

Dr. August Fok / Dr. WP Yau

The damage of articular cartilage is one of the common causes that may lead to persistent knee pain and swelling after a sports injury, especially in contact sports like rugby, football and basketball. It can occur as either an isolated injury or a concomitant injury of ligament or meniscus. Cartilage injury may cause disturbing intra-articular pain, while a more devastating problem is that of early degenerative osteoarthritis. Sports activity may be limited and in those severe cases even daily activity.





Sagittal (above) /coronal (below) MRI images showing a cartilage defect over the lateral femoral condyle

Traditional methods

In the past, cartilage defect was managed with marrow stimulation techniques like subchondral drilling or microfracture. The surgeon would attempt to create tiny fractures extending to the subchondral bone at the defect, so as to stimulate blood supply, and the release of pluripotent mesenchymal stem cells from the bone marrow. However, application was limited to those small defects. In addition, it was noted that it would only regenerate fibrocartilage at the site of defect, which considered "second-class" and thus had less resistant to wear compared with hyaline cartilage.

Another alternative for repairing the cartilage defect was by osteochondral autograft transfer. It involved harvesting of healthy cartilage together with small bone plugs from a relatively less important or non-weight-bearing part of the knee joint. Afterwards the plugs were transplanted to the defect. Though "first-class" native hyaline cartilage could be obtained at the defect, it is not the ideal solution given the donor site morbidity. Furthermore, since donor site is from the same knee, supply is limited and again the defect treated cannot be too big.

Recent advances

The development of regenerative techniques to restore hyaline cartilage has been the subject of extensive research in recent years. The early results of using these surgical techniques were encouraging, and appeared to provide possible solutions to this extremely challenging problem.

Autologous chondrocyte implantation

In this method, patient's own (autologous) cartilage cells (chondrocyte) are used to repair the lesion. It entails two separate surgeries. The first step is to obtain a small amount of patient's cartilage which is usually performed by arthroscopy. At the same time, details of the defect including size, depth and anatomical location are recorded for future reference.

The harvested cartilage sample is then sent to an overseas laboratory (since Hong Kong does not have the facilities), where the cartilage cells are extracted, cultivated and multiplied to the millions. Once the culturing process is finished, the cells are seeded on a membrane and sent back to the surgeon.

During the second surgery, the knee joint is exposed through an open incision (arthrotomy). The defect is prepared by debriding all the unhealthy cartilage. The membrane seeded with cultivated chondrocytes is then applied and fixed to the defect. Within months, these chondrocytes will be incorporated into the lesion and in effect repair the defect.

Autologous cartilage implantation can be used in large cartilage defect. As a result, native hyaline cartilage can be regenerated. The drawbacks are that it requires two operations and is expensive.

Synthetic cartilage implants

The use of synthetic materials to repair the cartilage lesion has been heavily invested by numerous biomedical companies in recent years. The idea is to deliver the reparative cells for repair employing a single surgery. At present, resorbable synthetic cartilage implant is commercially available, and it is designed as a scaffold to allow cartilage, bone cells and matrix ingrowth to the defect. Early results in animals and human were promising, in which the restored cartilage could be very smooth and well incorporated with adjacent cartilage. However, as is true in many techniques, long term studies are required to establish its safety and efficacy.

A Chat with Dr. Yau Wai Pan

Dr. Paul Koljonen / Dr. Margaret Fok

Q. What do you think of the service the division of sports and arthroscopy is providing at the moment?

At this moment, my most important concern is to achieve a reasonable waiting time in the outpatient clinic. For example, a young patient with an acute knee injury might previously have to wait up to 3 months for his/her first appointment, then another 3 months for MRI, then another few weeks for surgery. The main effort of the division is now to improve the service by streamlining our management. For acute injuries, we set the target to have them assessed within 3-6 weeks. Then, we try to prioritize these operations accordingly. We are still trying hard to meet this target. Nowadays, depending on the season, our average wait is 6 weeks.

In the past we kept patients in the hospital for a period post-operatively. Nowadays we minimize "unnecessary" in-patient stay because we believe that this is better for our patients. We achieve this through offering more day surgeries, improving our pre-op planning, and constructing clear surgical guidelines and protocols. By this concerted effort, everyone has the same goal and patient stay can be shortened.

High-quality rehabilitation is also very important in sports surgery. Our aim is to prevent repeated injury and maximize functional outcome. With the help of the physiotherapists we have rewritten all the rehabilitation protocols and set up a regular reassessment service. For example we closely follow up our ACL reconstruction patients for at least 1 year. We understand that it may take up to 2-3 years to be sure that recovery is maximized.

Q. What do you see is the main difference between Hong Kong and western countries in the spectrum of sports injury cases?

In terms of ligamentous and meniscal injuries of the knees, the spectrum of our injuries is similar. We see less hip injuries such as acetabular labrum tears because Asians tend to have less femoral-acetabular impingement problems.

Upper limb injuries, such as those seen in professional pitchers like baseball or softball players, or in tennis players, are much less common in HK. Asians have less shoulder instability problems as well.

And of course we don't have any winter sports here, so injuries of the wrist and ankle related to skiing or skating are also less common.

Q. You are very passionate about your research. Can you tell us something about your field of interest?

When we are doing research, there are a number of prerequisites we must attain: Firstly, we must identify the clinical problem that we want to address. Secondly, there must be adequate number of cases to gather meaningful data.

For example, in our division we place a lot of focus on anterior cruciate ligament (ACL) reconstructive surgeries. Despite the number of ACL surgeries done in the past 20-30 years, (as it is one of the most commonly performed sports surgeries in the United States), the world experts still believe that there is still a lot of room for improvement in the surgery.

Q. Using the ACL reconstruction as an example, what are some of the unsolved problems in the surgery?

As said, there is still a lot of room for improvement in terms of return-to-sports time and reducing repeated injuries.

Firstly, finding the "perfect anatomical footprint" for the ACL reconstruction is very challenging. The consensus is still evolving over the past 15 years. Even today, if you gather the opinions of the experts, they may have different opinions with regards to the

"perfect" site. Even if they agreed on the site, they may disagree on the technique on how to reproduce that site.

Secondly, we would like to find the optimal graft for the ACL reconstruction. There are certain properties we would like the graft to have: (1) adequate mechanical property to replace the original tissue, (2) durability, (3) speed of growth and assimilation of the graft, and (4) low infection rate. Furthermore, an optimal graft should incur no donor site morbidity. We believe that a biological synthetic graft using stem cell and tissue engineering may hold that promise.

Thirdly, graft fixation method is also a concern in patients with poor bone stock e.g. the revision cases of ACL reconstruction and elderly. Young patients with good bone stock, especially after the first injury, have no problem with graft fixation. But once we extend our indications to include people with poor bone stock, then we anticipate fixation to be a major concern.

Finally, we would like to enhance the graft healing and the graft incorporation within the bone tunnel. In order to achieve "better tunnel healing", we must provide a good "tunnel environment". After the graft insertion, a complicated "inflammation-regeneration-remodeling" process takes place in the tunnel. By using appropriate biological substrates, e.g. growth factors, we may be able to improve osteointegration of the graft to the bone tunnel.

Q. What are some of the difficulties you have encountered in your research?

One of the difficulties is to obtain a reliable research tool. Traditionally we have relied heavily on clinical examinations, for example the Lachman test and the instrumented anteroposterior laxity measurements. As there is no assessment tool for rotational instability, we can never be certain that our ACL reconstruction provide the best result for the patient. We are trying to develop a tool for measuring the rotational instability e.g. optical measurement, infrared measurement, gait analysis etc. However the progress is quite slow.

Residents' Corner

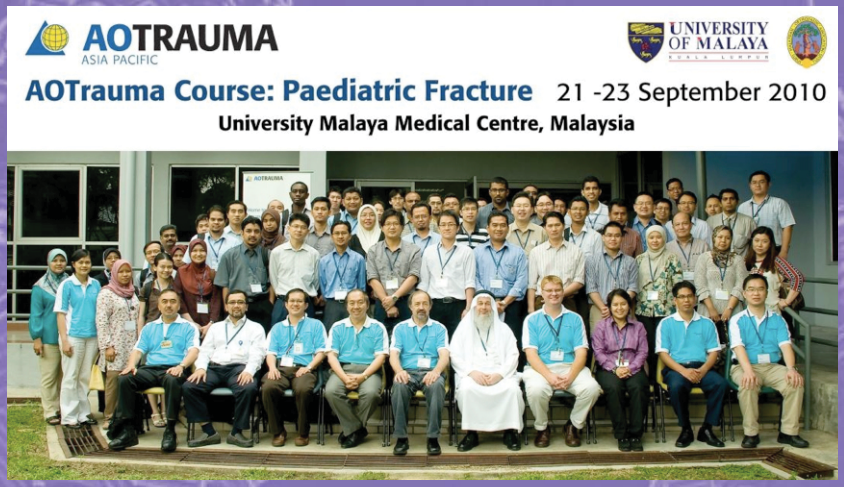
AO Trauma Paediatric Fracture Course, Kuala Lumpur September 2010

Dr. Dennis Yee

I was fortunate enough to participate in the AO Trauma Paediatric Fracture Course in Kuala Lumpur which was held in September this year. Participants were from all around the world. It was the first of its kind being held in Malaysia, and it represented a valuable opportunity to learn directly from world experts in this field, including a senior orthopedic surgeon from my own department. The lectures on supracondylar fracture of elbow were particularly enlightening, and the message was further enhanced in the workshop on fixation of the fracture on sawbones. I also enjoyed the case discussion where we were given a lot of chances to learn to appreciate X-rays of paediatric fractures. Management of delayed presentation of paediatric fractures were also discussed thoroughly in the case discussion sessions. The course ended with lectures on non-accidental injury and radiation hazard, which were important topics that were often ignored.

I visited the Twin Towers with a British and a South Korean orthopaedic surgeon. The Mid-Autumn Festival coincided with our course, and Dr Michael To from our department, kindly organized a Mid-Autumn Festival dinner inviting me and the overseas course instructors. We did not have moon cake, and we did not have a full moon to admire, but we did have a great time of sharing and I was appointed to explain the tradition of Mid-Autumn Festival. Guess what, in Korea they eat rice cake called "songpyon" in Mid-Autumn Festival instead.

I don't know if this could be a reason to bring you to Malaysia. But it was a truly enlightening trip to me that I would recommend to my colleagues.



Report for the APOA Depuy Spine Travelling Fellowship 2010

Dr. Christian Fang

I was one of the eight lucky participants in the Asia Pacific Orthopaedic Association DePuy Spine travelling fellowship in 2010.

First stop – Beijing – 17th to 24th October

We visited the Peking Union Medical College (PUMC) Hospital, hosted by Professor Qiu Guixing. Centrally located, this is one of the spearhead medical colleges in China, handling well over a thousand major spine operations annually.

I visited the Great Wall with other Traveling Fellows

During the week, we had repeated chances to observe their well-executed sequences of osteotomies, instrumentation and fusion for patients with severe deformities as well as degenerative disorders.

Second stop – Singapore – 24th to 27th October

The ultra-modern National University Hospital (NUH) presented a massive display of state of the art facilities and equipment.

We were especially thrilled to experience Professor Hee Kit Wong's technique in thoracoscopic anterior surgery for scoliosis. He also supervised us through a sawbone workshop, detailing steps and many precautions with this technique. We must appreciate that this is not a day in day out procedure for the average spine surgeon.

Third stop – Sydney – 27th October to 4th November

Sydney was bathed in sunlight and a very beautiful harbor. We had a chance to visit four hospitals all together with Dr Andrew Cree as our host.

Alike the aging Hong Kong, many of the elderly maintains an active lifestyle. We saw a variety of spinal procedures covering primary to revision; anterior to posterior; cervical to lumbar. I have learned more than just technical details but the complex philosophy behind the decision making in each operation.

Final stop – Taipei – 4th to 7th November

We presented our own research works in the 16th APOA triennial congress. Under the leadership of Prof PQ Chen, this year's congress was very successful with a huge number of participants. Our fellowship finally came to the end on 7th November.

Orthopaedic methodology is highly variable in different regions. Spinal cord monitoring was routine for most cases, they had a fulltime orthopaedic registrar doing this in Beijing; a specialized neuophysiological technician doing this in Singapore; and a neurologist doing this in Sydney. Basically, through different ways, they met a common goal - very high standards of care for their dearest patients.

A Chinese proverb translates "In order to attain wisdom, it is not enough merely to read books, you must be well travelled as well". It is impossible to quantize the colossal intellectual gains by the mere 20000 kilometers of travelling in these 3 valuable weeks. I would like to highly recommended this progamme to colleagues who eagerly wish to excel as spine surgeons.

My first thoracoscopic anterior surgery for scoliosis!

The 1st Basic Science and Anatomy Course in Orthopaedics and Traumatology for the FRCS(ORTH) Examination

Organizing Committee:
Dr. Christian Fang, Dr. Kevin Wong, Dr. CH Yan, Dr. Kelvin Yeung, & Dr. Margaret Fok (Convenor)

The first Basic Science and Anatomy Course in Orthopaedics and Traumatology for the FRCS (Orth) Examination, organized by the University of Hong Kong, was held on the 13th - 16th November 2010. This is the first of its kind in Hong Kong.

The aim of this course was to review the basic science relevant to orthopaedics. During residency training, our doctors have relatively little exposure to the basic science of orthopaedics, yet we all know it is fundamentally important and this is reflected in the fellowship examination.

The 4-day course covered topics ranging from musculoskeletal anatomy to pharmacology, from biomechanics to microbiology. We invited two very well-known and experienced tutors from the United Kingdon to teach, Professor Vishy Mahadevan, Professor of Surgical Anatomy and the Barbers' Company Reader in Anatomy at the Royal College of Surgeons of England, and Mr Kevin Sherman, Consultant Orthopaedic Surgeon at the Hull Royal Infirmary. Both bring with them extensive knowledge as teachers as well as examiners, and their reputation precedes them. Local speakers included Dr. YL Lam, Dr. HB Leung from our own department, Dr. TJ Yao from Clinical Trial Centre and Dr. CS Wong from the Department of Radiology and members of the organization committee.

Professor Vishy Mahadevan explaining the anatomy of the hand

Mr Kevin Sherman at the cadaveric workshop

The course comprised of lectures, practice vivas and cadaveric demonstrations. The participants felt a local course of this nature and caliber was long overdue. The tutors also treasured the experience and were particularly impressed with the knowledge of some of our junior trainees.

We are thankful that the course had been a great success with both participants and tutors, and we are preparing to organize another one in 2012.

We would like thank Prof. Keith Luk, Head of Department, for his support and leadership. And to the secretarial staff of the Department of Orthopaedics and Traumatology for all their assistance.

IFSSH 2010 SEOUL

11th Triennial Congress of the International Federation of Societies for Surgery of the Hand (IFSSH)

Dr. Margaret Fok / Dr. Kenny Kwan

We had the privilege to attend the IFSSH meeting (held every 3 years) in Seoul in November, this year. This is a meeting where hand surgeons from all over the world get together and share their experiences and new developments.

We were delighted to learn that Hong Kong ranked 4th with regards to number of papers accepted, after Korea, China and USA. We presented 26 papers.

The 4-day scientific program was packed with so many interesting topics that we had difficulty deciding which session to attend. We were also able to meet with and to learn from some of the world's most renowned pioneers in Hand Surgery, including Professor Michael Tonkin and Professor Arnold Peter Weiss who had visited our department. The trainees and junior fellows found it very educational in having to present their papers to a specialized group of audience.

We definitely would recommend this meeting to any resident who is interested in hand or microsurgery. The next IFSSH meeting will be held in New Dehli, India 2013.

Dr. Kenny Kwan, Dr. WY Ip and Dr. Margaret Fok (left to right) at the IFSSH 2010

Forthcoming Events

Basic Microsurgery Course

Please call Ms. Doris Lau at 2255 4581 or email lws835a@ha.org.hk for more information about the course

AO Trauma Course (Hong Kong)

The principles course in operative fracture management will be held between 28 -30 January 2011 at the Hong Kong Academy of Medicine, Jockey Club Building, 99 Wong Chuk Hang Road, Aberdeen, Hong Kong. For further information, please contact Ms. Doris Lau at 2255 4581 or email lws835a@ha.org.hk.

The 8th Hong Kong International Orthopaedic Forum

The 8th Hong Kong International Orthopaedic Forum will be held in conjunction with the 50th Anniversary of our Department, "50 years of excellence – Commemorating the past, exploring the future". The event is scheduled to be held between 18-21 August 2011.

Announcements

30th Annual Congress of the Hong Kong Orthopaedic Association

KMC Cheung, EE Kuong, D Samartzis, KWK Yeung, & KDK Luk were awarded the **AR Hodgson Award** for the best clinical paper and the **AO Spine Best Paper Award** at The 30th Annual Congress of the Hong Kong Orthopaedic Association, November 27-28, 2010. The title of the paper is *"A randomized controlled trial assessing the safety and efficacy of a novel superelastic rod in comparison to conventional titanium rod for scoliosis curve correction."*

M To, K Kwan, K Yeung, X Liu, K Wong were awarded the **Orthopaedic Basic Science Award** for their paper *"The modulating action of silver nanoparticles in collagen deposition to produce scarless wound healing."*

A Fok & WP Yau were awarded the **Best Paper Award from the Sports Medicine Chapter** for their paper *"Association of meniscus and cartilage lesions with anterior cruciate ligament tear".*

Dr. A. Fok, Prof. K. Luk, Dr. E. Kuong & Dr. M. To receiving the prizes at 30th HKOA annual congress

Biomedical Engineering International Conference 2010

HM Wong was awarded the top prize in the **Best Young Engineers' Paper Competition** for her paper *"Development of a new biodegradable polycaprolactone-magnesium porous hybrid for tissue engineering: mechanical, biological and chemical studies".* Her co-investigators and supervisors include KWK Yeung, PK Chu, KDK Luk, and KMC Cheung. In the same competition, **K Kwan** came third for her paper *" The modulating action of silver nanoparticles in collagen deposition to produce scarless wound healing".* Her supervisors include M To and KWK Yeung. The project was in collaboration with K Wong from the Department of Surgery and it was supported by the Seed Funding Programme for Basic Research, HKU.

CY Wen, JL Cui, Y Hu, KC Mak and KDK Luk were awarded the **2011 American Society of Neuroimaging Oldendorf Award** for the best manuscript based on research in CT, MRI, SPECT, PET, MSI, or brain mapping - *"The Diffusion Pattern of Healthy and Myelopathic Cervical Spinal Cord - A Template-based Analysis".*

Dr Y Hu was elected to be the council member of Medical Neural Engineering Committee of Chinese Biomedical Engineering Society, in Chinese Biomedical Engineering 2010 Annual Conference, Beijing, China, December 3, 2010.

W.K. TAM[a,b], A.A. F.de Vries[b], K.M.C. Cheung[a], V.Y. Leung[a], D. Chan[a], R.C. Hoeben[b], G-Q. Zhou[a] was awarded 3rd runner-up for the oral presentation in 15th Research Postgraduate Symposium at the University of Hong Kong on 2nd December 2010. Details of presentation – *"Role of HIF-α Subunits in the Chondrogenic Differentiation of Human Fetal Bone Marrow-Derived Mesenchymal Stem Cells".*

[a]Department of Orthopaedics and Traumatology, The University of Hong Kong, Hong Kong SAR, China
[b]Department of Molecular Cell Biology, Leiden University Medical Center, Leiden, the Netherlands

DONATIONS

Mr & Mrs Lo Chung Hin donated a sum of HKD300,000 in support of the research project entitled "Development of Antimicrobial Peptide Coated Metallic Implant for Bone Fracture Fixation" undertaken by Dr. Kelvin Yeung.

Anonymous HKD180,000 - in support of the research in joint replacement surgery and treatment of arthritic conditions undertaken by Professor KY Chiu and Dr. CH Yan.

Ms Grace Lee Yi Man donated a sum of HKD50,000 in support of research and patient care activities undertaken by Division of Spine Surgery.

Mr Aaron Ho donated a sum of HKD40,000 in support of research activities undertaken by Division of Orthopaedic Truama.

GRANTS

Dr. WP Yau was awarded by The Board of Management of the Chinese Permanent Cemeteries, Annual Charity Donation 2010 in the amount of HKD424,400 in support of the project "High-definition arthroscopic system".

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