

Professor Freddie H. Fu: admit that you make mistakes—learning never stops!

Received: 19 June 2017; Accepted: 30 June 2017; Published: 20 July 2017.

doi: 10.21037/aoj.2017.07.01

View this article at: <http://dx.doi.org/10.21037/aoj.2017.07.01>

“That’s a problem,” said affirmably by Professor Freddie H. Fu (*Figure 1*) during an exclusive interview with AME, “if you think you know everything!”

As a world-renowned doctor and pioneer in the field of sports medicine who has published over 500 papers, performed approximately 8,000 cases of anterior cruciate ligament (ACL) surgeries, trained more than 800 physicians from all over the world, and received nearly 200 distinguished awards or accolades, what has always been on his mind is, “I’m still learning. Learning never stops!”

After all, what sort of refined aspiration does this modest celebrity doctor embrace that leads him to today’s success?

Perseverance as the key to improvement—nothing as “one-size-fits-all”

Since 1982, Professor Freddie H. Fu has been serving at the University of Pittsburgh School of Medicine Faculty. Over the past 30 years in performing ACL surgeries, he has met with a wide range of formidable challenges from technical to knowledge levels.

Open surgery, as the earliest type of ACL surgery, is usually associated with large surgical incision, long recovery period and up to 3-hour operation. Based on the limited technology and knowledge they had at that time, performing such surgery was a tremendous challenge to them. In 1986, the Faculty started to perform arthroscopic-assisted ACL surgery, which significantly shortened the operation time and was much less invasive. However, what they adopted was a non-anatomical approach. Even though the rehabilitation progress had been immensely sped up, clinical follow-up studies indicated patient’s rotatory instability of the knee in the long run after undergoing the surgery. It was not until 2000 or so that they started the double bundle approach which makes use of the anatomical theories to tailor-make a personalized reconstruction method for each particular patient.

Over the years, ACL surgery has developed from a pure



Figure 1 Professor Freddie H. Fu.

technique to an “individualized” concept that drills deeply into the internal structure of the body. To Professor Fu, the biggest improvement made in ACL surgery is the widened knowledge base about ACL, “We get to know the principle about anatomy and realize the fact that ACL is a dynamic structure like a heart: The heart pounds, and ACL stretches when you play sports. It is a living structure that consists of stem cells, nerve and supply, and it works with the bone morphology of the knee. Like any other living structures, ACL has the property of aging. The exact motion that everybody takes is different. The key is “variation”. Medicine in the future is all about “variation”. If you want to do a one-size-fits-all surgery, you are going to make mistakes. Therefore, we must get away from one approach.”

Admit what you have done wrong—look forward to the future

Speaking of “variation”, Professor Fu is best known for his persistence in chasing after “variation”. Being asked how to formulate individualized reconstruction approach for the specific need of each patient, he said the prerequisite is to

“look at one you have done in the past, and admit that you make mistakes”.

On a technical level, prior to drawing up an ACL reconstruction plan, physicians have to gather information from magnetic resonance imaging about the tibial size, thermal distribution, bone morphology and so on. The size of each ACL reconstruction varies: for smaller ACL like the hamstring tendon, a single-bundle reconstruction is indicated. Patellar tendon of middle size can be dealt with using either the single- or double-bundle approach. Surgeons must consider the double-bundle technique for bigger ACL such as the quadriceps tendon.

Moreover, in order to accurately locate the bone tunnel, ACL reconstruction surgery generally removes the remnant. Yet the preservation of remnant can help restore patient's sensation and the recovery after tendon grafting. Whether or not remnant preservation should take place has become one of the major considerations during the surgery.

When we play sports, the ACL can stretch 20%. The body will then self-repair by replenishing the cell depth and synovial membrane. This implies the healing potential of the ACL. Therefore, the biggest question in the future is: how can we repair the ACL? In the next 25 years, Professor Fu aims to improve the surgical outcomes from the anatomical, biological and biomechanical aspects. To him, an objective outcome measurement must be in place to judge if the outcome is good or not.

Here arises a question: how do we define if a surgery is successful? Professor Fu said, “the two key words are ‘anatomical’ and ‘individualized’. Have them in mind as a principle and apply it. No matter you are performing the single- or double-bundle approach, remnant preservation, tendon repair or different graft choices, take the right patient to the right treatment. Healing takes time. You can never hurry.”

Learning as a lifelong career—patients always go first

Endowed with a parental heart, in order to benefit more patients who can be bestowed with most appropriate treatment, Professor Fu established the UPMC Rooney Sports Complex (originally called the Sports and Preventive Medicine Institute) in 1985.

The center was first built on a site of only 1,000 square feet. In 1988, the center moved to another site of 15,000 square feet with swimming pool, rehabilitation center and clinic. It was until 1998 that they expanded the area

to 50,000 square feet, and started working closely with different professional teams in the hope of addressing athletic injuries induced by football.

To further provide treatment for hockey and iced hockey injuries, the sports complex set up another center 20 miles away last year. The two centers cost a total of 160 million US dollars, and became the world-famous comprehensive sports centers assembling together surgery, therapy, concussion, scientific research, training, nutrition and psychology.

From yesterday a small space to today a fully-equipped sports center, other than being dedicated to work, Professor Fu has been adhering to three fundamental principles: First, provide best care for patients; Second, educate physicians all over the world; And third, relentlessly conduct research, keep learning and making progress.

Professor Fu is fully confident about the prospects of the sports complex, “beside the sports center, we have a very good biodynamic laboratory and other robotic technology that we can use to objectively observe the motion of the knee in running and other activities. Behind us is a team of fantastic researchers who conduct research in the biological, biomechanics and biodynamic aspects. Also, we publish a lot. Just ACL alone, there are tremendous number of papers we publish every year. With the factors we have, many things will happen. Our future is bright.”

Join hands together—make our dreams come true

As one of the editors-in-chief of the *Annals of Joint (AOJ)*, Professor Fu was ecstatic about being part of this journal. In his opinion, China should initiate more high-quality journals like *The Journal of Bone & Joint Surgery (JBJS)*, *The American Journal of Sports Medicine (AJSM)* and *Knee Surgery, Sports Traumatology, Arthroscopy (KSSTA)* to foster communication among Chinese and international experts, discuss numerous medical issues and manifest more medical miracles. He expects *AOJ* to develop slowly. Having the high-quality articles and professional editorial board maintained, step by step it can obtain more subscriptions and readership. Success is just around the corner.

In this long march, never should we give in. Together we can learn from Professor Fu's success, “always ask how we can get better care for patients, what I have done wrong, if there is anything I can do better... The key is to put patients number one. That's a problem if you think



Figure 2 Professor Freddie H. Fu: admit that you make mistakes—learning never stops (1)!

Available online: <http://www.asvide.com/articles/1604>

you know everything. Learning never stops. Learning is forever!”

Expert’s Information:

Freddie H. Fu, the chairman and professor of the Department of Orthopaedic Surgery and head team physician of the Department of Athletics at the University of Pittsburgh, the founder of the UPMC Rooney Sports Complex (originally called Sports and Preventive Medicine Institute), a specialist and pioneer in the areas of orthopaedic surgery and sports medicine. Fu is an active member of numerous academic organizations, including the American Orthopaedic Association, Herodicus Society and Orthopaedic Research and Education Foundation (OREF).

In 2008, Fu was named President of the American Orthopaedic Society for Sports Medicine (AOSSM). In 2009, he was inducted into the International Society of Arthroscopy, Knee Surgery and Orthopaedic Sports Medicine as President. In 2010, he was appointed by the University of Pittsburgh as a “Distinguished Service Professor”. In 2011, he received the “Diversity Award” from American Academy of Orthopaedic Surgeons (AAOS) and became the ninth recipient and the first Asian American recipient of the award.

In terms of scientific research, he is committed to conducting extensive research on athletic injury related issues in the biological, biomechanics and biodynamic aspects. He wrote and edited a wide range of peer-reviewed research articles, book chapters on the management of sports injuries and orthopaedic textbooks.

He is also very concerned about the training of physicians. He supervises an American top-rated orthopaedic residency training program. In 2010, he donated 1 million US Dollars to establish the “Freddie and Hilda Fu Endowed Fund” in order to sponsor the education and training programs at the University of Pittsburgh.

For the original information, please enjoy the video interview (*Figure 2*).

Acknowledgments

On behalf of the editorial office of *Annals of Joint (AOJ)*, I would like to extend my gratitude to Prof. Fu for sharing his opinion with us.

Funding: None.

Footnote

Provenance and Peer Review: This article was commissioned by the Editorial Office, *Annals of Joint* for the series “Meet the Professor”. The article did not undergo external peer review.

Conflicts of Interest: Both authors have completed the ICMJE uniform disclosure form (available at <http://dx.doi.org/10.21037/aoj.2017.07.01>). The series “Meet the Professor” was commissioned by the editorial office without any funding or sponsorship. BL reports that he is a full-time employer of AME Publishing Company (publisher of the journal). SZ reports that she is a full-time employer of AME Publishing Company (publisher of the journal). The authors have no other conflicts of interest to declare.

Ethical Statement: The authors are accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

Open Access Statement: This is an Open Access article distributed in accordance with the Creative Commons Attribution-NonCommercial-NoDerivs 4.0 International License (CC BY-NC-ND 4.0), which permits the non-commercial replication and distribution of the article with the strict proviso that no changes or edits are made and the original work is properly cited (including links to both the formal publication through the relevant DOI and the license). See: <https://creativecommons.org/licenses/by-nc-nd/4.0/>.

References

1. Li B, Zhou S. Professor Freddie H. Fu: admit that you make mistakes—learning never stops! *Asvide* 2017;4:281.

Available online: <http://www.asvide.com/articles/1604>

(Brad Li, Silvia Zhou, AOJ, aoj@amegroups.com)

doi: 10.21037/aoj.2017.07.01

Cite this article as: Li B, Zhou S. Professor Freddie H. Fu: admit that you make mistakes—learning never stops! *Ann Joint* 2017;2:43.