Review Article

The revolution of reconstructive microsurgery: Dr. Fu Chan Wei and the Chang Gung Memorial Hospital

Margaret Man-Ger Sun, PhD[1], Jason G Williams, MD, MEd, FRCSC[2]

1. Faculty of Medicine, Dalhousie University
2. Division of Plastic Surgery, Dalhousie University

Introduction

Dr. Fu Chan Wei (Chinese: 魏福全) is a household name in the world of plastic surgery, particularly in the field of reconstructive microsurgery. The mere mention of Dr. Wei's name brings to mind countless contributions and surgical advancements, including the fibula osteoseptocutaneous flap, mandible reconstruction, toe-to-hand surgery, among others1. After creating a globally sought-after microsurgery fellowship training program at Chang Gung Memorial Hospital located in Taipei, Taiwan (Figures 1, 2), Dr. Wei went on to establish the Reconstructive Microsurgery Center and has since cultivated it into a world leading microsurgery center with impressive cumulative case volume and research productivity[1,2].

This article explores Dr. Wei's journey to becoming one of the most recognized plastic surgeons of our time, and the process in which he developed the infamous Reconstructive Microsurgery Center at Chang Gung Memorial Hospital. By navigating through his story, we hope to catch a glimpse of the makings of a legend who continues to revolutionize plastic surgery today.

The Road to Microsurgery

Dr. Wei was born in Tainan, Taiwan, and earned his medical degree from Kaohsiung Medical College in 1972[3,4]. From 1973 to 1979, Dr. Wei completed his surgical residency at Kaohsiung Medical College and Mackay Memorial Hospital, followed by a plastic surgery residency at Chang Gung Memorial Hospital, where he served as surgical chief resident[5]. It was during his time at Mackay Memorial Hospital and Chang Gung Memorial Hospital that Dr. Wei met Dr. Samuel Noordhoff, an American plastic surgeon who became Dr. Wei's mentor and greatly impacted his career trajectory[1,4]. Deeply inspired by Dr. Noordoff's compassion and dedication to his patients, Dr. Wei followed in his footsteps and embarked on fellowship training in microsurgery at the University of Toronto followed by a second fellowship in hand microsurgery at the University of Louisville[4,5].

Himself a remarkable individual, Dr. Noordhoff came to Taiwan as a medical missionary and after serving as Mackay Memorial Hospital's superintendent for 16 years, subsequently assumed the role of the inaugural superintendent of Chang Gung Memorial Hospital where he founded the plastic surgery division[4]. Dr. Noordhoff would later go on to establish the Noordhoff Craniofacial Foundation in 1989, a non-profit organization aimed to provide care to patients with cleft palate and craniofacial deformity, and ultimately be remembered as the father of plastic surgery in Taiwan[6,7]. Upon closer examination, one can see many parallels in the leadership and mentoring styles of Dr. Noordhoff and Dr. Wei – both extremely dedicated to supporting further advancement of trainees to create stellar pupils who would continue on and amplify their impact[1,7]. It is likely the possession of this unique attribute led to their respective successes.

Major Contributions: Past and Present

Among the many innovative contributions Dr. Wei has made to plastic surgery, one of the most well-known is his introduction of the fibula osteoseptocutaneous flap in 1986[1,8]. Since then, Dr. Wei and his team continued to refine this technique and extend its application to reconstruction of the mandible and extremities[9,10,11]. With Chang Gung Memorial Hospital being a primary referral center for mandible reconstruction, this subsequently led to the development of simultaneous placement of osseointegrated implants in the fibular osteoseptocutaneous free flaps for mandibular reconstruction[12]. Lastly, Dr. Wei also significantly contributed to the advancement of the toe-to-hand surgery where he pioneered the trimmed-toe transfer technique to improve the overall appearance and function of the reconstructed thumb, introduced the second toe wraparound flap, and developed simultaneous multiple toe transfers[13,14,15].

More recently, Dr. Wei has turned his focus to vascular composite allotransplantation (VCA) and currently acts as the chief of the Center of VCA at Chang Gung Memorial Hospital[3]. Since its establishment in 2011, Dr. Wei and his team have been working towards lowering the risks of immunosuppression to make VCA routine practice at Chang Gung Memorial Hospital. Current research efforts have been focused

on inducing VCA tolerance through different means including adipose-derived stem cells and regulatory T cell adoptive cell therapy[16,17]. Additionally, novel VCA animal models are being established where Dr. Wei and his team recently developed a novel syngeneic face subunit transplantation model in C57BL/6 mice that can be used for future research applications[18]. It is with great interest and excitement that we continue to follow Dr. Wei's research on VCA and await innovative translational findings.

Chang Gung Memorial Hospital and the Infamous Microsurgery Fellowship

Shortly following the establishment of the Microsurgery Fellowship at Chang Gung Memorial Hospital in 1984, Dr. Wei oversaw the development of the Reconstructive Microsurgery Center at the same institution which houses a 24-bed Microsurgical Intensive Care Unit (MICU)[1,19]. The MICU is staffed by highly specialized nurses skilled in flap monitoring as well as physical therapists who work together to provide comprehensive care to patients, undoubtedly playing a crucial part in the center's ability to perform more than 1000 microsurgical cases annually with a success rate of 98%[19,20].

Given the influential history of Dr. Wei and the division of plastic surgery at Chang Gung Memorial Hospital, it is no surprise that the Microsurgery Fellowship is highly sought after by candidates worldwide. Each year, 80-90 applicants apply for eight total spots in the fellowship program, making it extremely competitive[19,21]. Once accepted, each fellow partakes in one-on-one teaching with a senior surgeon following a brief meeting with Dr. Wei who helps to individualize the fellowship experience19. Morning case study discussion meetings, pre-surgery discussions, and skills refinement by performing at least two free flaps per week make up the training model[19,21]. In addition to clinical duties, the Chang Gung Memorial Hospital provides extensive opportunities for fellows to engage in cutting-edge research[19].

The Chang Gung Microsurgery Fellowship program has trained 1312 fellows and visiting scholars from 71 countries between its inception and 2016. This is effectively fulfilling the program's goal of spreading Taiwan's medical advancements worldwide and help increase the calibre of the next generation of surgeons[21]. To take it one step further, in 2015 Dr. Wei transformed the clinical research microsurgery fellowships into the International Master of Science Program in Reconstructive Microsurgery, effectively situating the program globally so dissemination of microsurgery research and knowledge can reach areas of the world most needed[21].

Conclusions

As we travel through Dr. Fu Chan Wei's journey in becoming the influential figure he is today, we notice several themes that have remained pillars throughout his incredible career. Seemingly inspired by Dr. Noordhoff, Dr. Wei appears to have placed making global impact on those who need it most at the forefront. This, combined with his passion for teaching and cultivating the next generation of surgeons, has helped revolutionize reconstructive microsurgery. As echoed by countless former students, his compassion, courage, humility, and most importantly connection to humanity are unparalleled, and may be pearls we all should take with us as we progress through our own journeys.

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