

Feng Liu  
*Editor*

# Dental Digital Photography

From Dental Clinical Photography to Digital  
Smile Design



PEOPLE'S MEDICAL PUBLISHING HOUSE



Springer

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From Dental Clinical Photography  
to Digital Smile Design



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## Editors and Authors

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### About the Editors



**Feng Liu** Deputy Director of 1st clinical division of Peking University School and Hospital of Stomatology, Director of the Training Center for Esthetic Dentistry, Director of Department of Comprehensive Dentistry.

- Executive committee member and academic secretary of Chinese Society of Esthetic Dentistry (CSED).
- Member of Prosthodontics Professional Committee of the Chinese Stomatological Association (CSA).
- Executive committee member of the Oral Plastic Surgery Branch of the China Association of Plastic surgery (CAPA).
- Youth Committee of Medical Aesthetics and Beauty Branch of the Chinese Medical Association (CMA).
- European Society of Cosmetic Dentistry (ESCD) Chairperson of China, Member of Executive Committee.
- Certified International Trainer of International Computer Dental Association (ISCD).
- Member of American Academy of Cosmetic Dentistry (AACD) and Japan Academy of Esthetic Dentistry (JAED).
- Published more than 50 scientific papers and lectures in major academic journals.
- Editor and reviewer for the Chinese Journal of Stomatology and other academic journals.
- Editor-in-Chief for the main translation and publication of 12 monographs.
  1. “Dental digital photography”. 2006, Beijing, People’s medical publishing house.
  2. “The aesthetic of the clinical practice of Stomatology”, 2007, Beijing, People’s medical publishing house.
  3. “Beauty starting from tooth” 2007. Beijing. People’s Military medical Press.
  4. “Fundamentals of Color, Shade Matching and Communication in Esthetic Dentistry” (Primary Translator). 2008. Beijing. People’s Military medical Press.
  5. “The cosmetic dentistry”. 2010. Beijing. People’s medical publishing house.
  6. “Dental digital photography” (The Second Edition). 2011. Beijing. People’s medical publishing house.

7. "Fiber post technology", 2012, Beijing. People's medical publishing house.
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9. "Fine impression technique." 2013, Beijing, People's medical publishing house.
10. "The training materials of cosmetic specialist in Beijing", 2014. China Medical and Health Publishing House.
11. "Know a thing or two to the dentist", 2014, China Medical and Health Publishing House.
12. "Case Omnibus of Chinese Esthetic Dentistry 2015", 2013. Beijing. People's medical publishing house.



**Yi Li** is prosthodontic specialist in the department of comprehensive dentistry in 1st clinical division of Peking University School and Hospital of Stomatology, as well as a member of the Chinese Stomatological Association (CSA) and Japan Academy of Esthetic Dentistry (JAED). Dr. Li has been engaged in aesthetic prosthodontics clinical and teaching activities. She served as part of a series of aesthetic series in theory teaching and clinical work organized by the training center at Peking University School of Stomatology's continuing education programs. She won second place in the first VITA Cup medical technology matches in 2012. She participated in the preparation of the second edition of *Dental Digital Photography* as the second author and other professional books, such as *Fiberpost Technology*, *Tooth Preparation in the Esthetic Dentistry*, and *The Fine Impression Techniques*.



**Xiaorui Shi, DDS** is a prosthodontic specialist who works in the department of comprehensive dentistry in 1st clinical division of Peking University School and Hospital of Stomatology in 2010. She is a youth professional committee member of the Chinese Society of Esthetic Dentistry (CSED), and member of Japan Academy of Esthetic Dentistry (JAED). Dr. Shi focuses on clinical examination, diagnosis and multidisciplinary comprehensive analysis of occlusion problems. She has participated in two international multi-center cooperation projects and helped to draft of a number of clinical monographs, such as *the second edition of Dental Digital Photography*, *Fiber Post Technology*, *Tooth Preparation in the Esthetic Dentistry*, *The Fine Impression Techniques*, *Application of facebow and articulator* and *the 9th edition of Undergraduate Textbook on Occlusion*. She has also completed a number of domestic and foreign experts' training courses.

## About the Authors



**Liang Han** is Deputy Secretary-General of Chinese Stomatological Association (CSA), editorial board member of the *Chinese Medical Continuing Education Magazine in dentistry*, member and secretary of the dental equipment branch of the Chinese Stomatological Association Committee, and vice president of Beijing Daxingxingyei Stomatological Hospital. Dr. Han graduated from the Stomatological School of the Fourth Military Medical University with a Master's degree in dentistry. Dr. Han is mainly engaged in oral outpatient management, oral clinic team building, oral medicine digital research and oral health science propaganda at present. Dr. Han participates in oral professional lectures and health science propaganda activities organized by oral medical institutions, financial institutions, communities and media organizations.



**Tongfeng He** graduated from the Fourth Military Medical University in 1985. He worked at the critically acclaimed outpatient Department of Stomatology. He established Pine Valley Dental and now has two high-quality clinics: Beijing Feng Jing Oral and Huajing Oral Nest Clinic. Dr. He is a member of the Chinese Stomatological Association (CSA), Honorary Vice President of the Chinese Academy of Esthetic Dentistry. Professional Committee of the implantation branch of the Beijing Stomatological Association, China (BSAC), and Sedative and Analgesic Specialized Committee of Beijing Stomatological Association .China (BSAC). He is director of the Bicon Implant China training center, editor of "Dental Cosmetology and Planting" for the World Dental Forum, member of ICOI, and member of DentalED, among others.

Dr. He is one of the earliest all-ceramic technology physicians. He has a wealth of clinical experience in the field of oral beauty, cultivation, and other fields. He is invited to lecture in the country frequently.



**Wei He** has a master's degree from the College of Dental Medicine, Xi'an Jiao Tong University and holds China's first international certification of dental aesthetics DSD master degree. He is a member of the First Aesthetics Committee of the Chinese Stomatological Association (CSA) and Head of the Xian Yazhi. Two of his clinical cases were included in the *Case Omnibus of Chinese Esthetic Dentistry 2015*. He is an Ivoclar aesthetics lecturer and Korea "Taward World" oral hospital guest physician. He is one of the Chinese dentists who developed DSD digital design in clinical practice. In 2012, he was an invited guest for the Korean 34th oral annual session. He carried out the DSD aesthetic design tour in more than 20 cities (Beijing, Shanghai, Fujian, Hangzhou, Nanjing, Changchun, Dalian, Changsha, etc.). His lecture provided on-site practical instruction for thousands of dentists.



**Huan Huang** is Director of Beijing GAIDE International Dental Center (GIDC), Secretary of the private oral health care branch of the Beijing Stomatological Association, China (BSAC). He was the Chairperson for Chinese region of Aesthetic training center of UCLA in 2014 and is the China District Director of GIDE/Loma Linda master of aesthetics and implantology course since 2008. He was the Chinese version editor of DTI “World Dental Forum,” Chinese editor-in-chief of “Planting Forum,” an American Dental Association (ADA) member, and a member of the Dental Instruments Branch of the Chinese Stomatological Association (CSA).



**Shan Jiang** Director of Beijing Noah’s clinics, graduated from the Oral Department of Capital Medical University in 1989 and enrolled in “Beijing Excellent Dental.” Dr. Jiang published his first work on technical porcelain in 1993 and joined Ivoclar Vivadent in 1995. He became Technical Director of China Ivoclar Vivadent. Dr. Jiang gave hundreds of lectures at major hospitals in China, participated in EMAX ceramic research and trials in 2002, and participated in the preparation of domestic oral medical textbooks in 2004. He established Beijing Noah clinics in 2005 and developed the first domestic porcelain veneer technology in 2006. He accumulated a lot of minimally invasive clinical experience with porcelain laminate veneers. Dr. Jiang served as one of the EMAX’s global aesthetic contest selection experts in 2016.



**Shiming Liu** graduated from the Peking University School of Stomatology with a DDS in Prosthodontics and is a member of the Chinese Stomatological Association (CSA) and IPCC. She majored in basic research related to dental restorative material and clinically specializes in the restoration of tooth defect, and multidisciplinary treatment of dentition defects and implants. She published a number of papers in domestic core journals, SCI and EI. She helped to draft clinical monographs such as *Fiber Post Technology* and the *Graduate Textbook on Fixed Restoration Research*. Since 2012, she participated in clinic training center training courses in aesthetic dentistry at the Peking University School of Stomatology. She has served as interpreter for the third VieSID courses in China.





**Xinran Liu** is a prosthodontist who graduated from the Peking University School of Stomatology in 2013 with a DDS. He is a member of the European Society of Cosmetic Dentistry (ESCD). After graduation, Dr. Liu served as a prosthodontist in the department of comprehensive dentistry in 1st clinical division of the Peking University School and Hospital of Stomatology, focusing on all types of direct and indirect fixed restorations as well as comprehensive dental aesthetics treatment. He helped to draft “Beijing Cosmetic Dentistry Training Materials,” “*Case Omnibus of Chinese Esthetic Dentistry 2015*,” and other professional works.



**Xing Liu** graduated from Peking University School of Stomatology in 2014 with a DDS in prosthodontics as a student of Professor Deng Xuliang. He served as an oral comprehensive physician in the department of comprehensive dentistry in 1st clinical division of Peking University School and Hospital of Stomatology, with a focus on fixed prostheses, the comprehensive treatment of aesthetics dentistry, digital work flow in dentistry and related research, bone regeneration, and biomaterials. He is a member of the Chinese Stomatological Association and the European Society of Cosmetic Dentistry (ESCD).



**Bo Peng** graduated from Central South University Xiangya Medical College of Oral (former Hunan Medical University) in 1996. He is the director of ARRAIL Dental Medical in Shenzhen, a senior specialist in esthetic restorative dental treatment, a member of the American Association of Cosmetic Dentistry (AACD), and a member of the European Association of Cosmetic Dentistry (ESCD). He participated in the first session of the Committee of Cosmetic Dental Plastic Surgery (a branch of China Cosmetic Dental Association) and the first Aesthetic Specialized Committee of the Chinese Stomatological Association (CSA). He has been to South Korea, the United States, Germany, and Italy for continuing education in esthetic dentistry. He has accumulated rich experience and published many clinical papers in the area of dental aesthetics and digital photography.



**Ying Wang** graduated from Peking University School and Hospital of Stomatology with a master's degree in 2013. Dr. Wang is a member of the oral biology and medicine branch of the Chinese Stomatological Association, worked in the department of comprehensive dentistry in 1st clinical division of Peking University School and Hospital of Stomatology, and is involved with the tooth repair and integrated treatment of periodontal disease as a main research direction. Dr. Wang's basic and clinical research focused on bone regeneration during the period of study, with a major in the design, preparation, cell and animal experimental evaluation, and clinical application of biodegradable stents and biodegradable membranes. Dr. Wang published two SCI papers with first authorship and a cumulative impact factor of 5.874.



**Mingming Xu, PhD** is a prosthodontic specialist, a member of the Chinese Stomatological Association, and a youth member of the Chinese Society of Biomaterials. Dr. Xu focuses on dental aesthetics and functional mandibular defects with digital restoration and the study of dental materials. Dr. Xu has participated in multiple research projects, including national 863 program, national supported program, and the National Science Fund. Dr. Xu achieved the digital sequence repair of severe maxillary defects, is committed to platform construction at multi-center oral medical clinical research and digital medical research, established the first network platform for oral medical clinical research and multilayer centers as a leader, and promotes this platform for applications at the grassroots level. Dr. Xu has published 16 articles, including six SCI papers and one piece of translated work.



**Tongkai Xu** was admitted to the Department of Stomatology at Beijing University School of Medicine in 2001 and received a doctoral degree in oral clinical medicine in 2009. Currently, he works for the university. Dr. Xu studied at the University of Rochester in the United States between 2012 and 2013 and completed the Advanced Oral General Dentistry training project (AEGD). He was hired as one of the first comprehensive physicians at Peking University Stomatological Hospital and has visited Japan, Germany, France, Russia, and other countries for continuing education. He is a youth member of the oral plastic surgery branch of the Chinese Plastic and Cosmetic Surgery Association. He has edited and translated a number of books on stomatology and written a number of articles. His main research interests include dental color, full ceramic adhesive restoration, and oral education.



**Tao Yu, DDS** graduated from Peking University School of Stomatology in 2015. He worked in the outpatient department of the General Department of Peking University School and Hospital of Stomatology. He has published several articles in major academic journals, participated in the publication of professional books, also have participated in the translation of two professional books.



**Yu Tian, PhD** is a physician at the Peking University School of Stomatology and member of the stomatological periodontal branch of the Chinese Stomatological Association. She received a bachelor's degree, master's degree, and Ph.D. in clinical medicine from the Peking University School of Stomatology. Dr. Yu is currently engaged in the comprehensive treatment of periodontal disease design, periodontal surgery, non-surgical treatment, and implant surgery, with a focus on periodontal tissue and implant aesthetics-related processing. She participated in a number of National Natural Science Funds, the Capital Health Industry Development fund, and other research projects. She published three articles in domestic and foreign academic journals as first author, one of which was included by SCI.



**Zhensheng Zhang** graduated from the School of Stomatology at Tianjin Medical University and is founder and president of Tianjin De-best Dental Clinic. Dr. Zhang is a member of the International Computer Dental Association (ISCD), a training instructor in international ceramic cores, a member of the Implant Dentist Association (ICOI), and member of the Chinese Esthetics Dental Association (CAED), executive director and member of the Chinese Stomatological Association (CSA), and a member of the American Dental Association (ADA). Dr. Zhang is pioneer of and expert on chair-side dental CAD/CAM systems and has been invited to many colleges and universities to provide advanced training courses on the subject. Dr. Zhang visited the United States and Germany many times for professional studies and is a German SIRONA Dental College consultant and CEREC senior training instructor.

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## Preface

The significance of medical photography in clinical practice has long been known to dentists in various disciplines, especially oral surgeons. By means of clinical photography, the dentist can record a patient's case with greater medical accuracy. By analyzing these photographic images in medical records, the dentist can schedule appropriate treatment. Furthermore, the information exchange between patients and other relevant departments is enhanced. Clinical treatment plans, patient education, and other market development can be greatly improved.

Photography has been widely used in oral medicine in recent years, especially in aesthetic procedures. Advanced oral clinical photography is an important aspect in the advancement of this field. This book focuses on each subdiscipline of oral medicine with regard to general clinical image shooting and meets the requirements for dental aesthetic treatments. It focuses on the international standards and specifications for dental aesthetics and the application of clinical photography in these treatments.

In this revised third edition of *Dental Digital Photography*, you will notice some adjustments to the framework compared with the first two editions. The presentation of basic knowledge, photographic equipment, and basic applications has no obvious change in structure. However, the content is more substantial than in the previous versions. This edition also describes how to meet the requirements of clinical photography using the frequently upgraded hardware equipment.

The second part of the book was greatly enriched. A variety of clinical images are presented so that the clinician can understand their significance clearly. We also describe the basic process of the very popular Digital Smile Design (DSD) in the section on image post-processing and applications. Information was added on related cases of comprehensive oral aesthetic treatment, including clinical photography. Specifications and clinical shootings are included in the appendix, which can become a virtual assistant to the dentist.

This book follows the development of the new era of clinical photography, comprehensively describing definitions, principles, methods, standards and specifications. It can be used as a primer for oral photography education, as well as a textbook for clinicians who are interested in further improving their oral aesthetics practices. For regular readers who have already read the previous editions, I believe that the third edition of *Dental Digital Photography* will be more comprehensive, deeper, more systematic, and provide a greater sense of knowledge. It will contribute to a clearer understanding of the scientific oral clinical photography concepts and methods.

I hope readers of all levels will find useful content herein, gaining assistance and inspiration from this book.

2016 July

Feng Liu

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## Preface to the Third Edition

After a lapse of 5 years, I received a solicitation for a third edition of *Dental Digital Photography*. Although I have published twelve professional books in these years, my affection for *Dental Digital Photography* cannot be replaced.

Ten years ago, when I was a new dentist, I found a breakthrough point in clinical photography with the support of a doctor and predecessor at Peking University School of Stomatology. With my curiosity, resilience, and aptitude for professional technology, I promoted aesthetic dentistry along with clinical at the same time. By benefiting from the large amount of data in clinical photography, I became one of the aesthetic dentists in China who had a large number of successful cases.

I was fortunate to have had deep communication with industry predecessors Dr. Shan Jiang and Dr. Tongfeng He. I inherited a lot of oral aesthetics clinical skills from them. At the same time, I worked with Dr. Liang Han and Dr. Huan Huang as brothers and comrades for many years. Under the leadership of these colleagues with common aspirations, I had the opportunity to publish the first edition of *Dental Digital Photography* in 2006. It was the China's first specialized monograph for oral clinical photography. Because it addressed a technology gap, the book was quickly recognized by many clinicians. The first edition was reprinted several times within a few years. Many dentists stepped into the world of oral clinical photographs with this book.

*Dental Digital Photography* and *Clinical Practice of Stomatology Aesthetics* are two of my early masterpieces. The latter was written solely by me. Many dentists know me through these two books. Photography is indeed very significant for clinical doctors. With the popularity of dental clinical photography, the clinical skills of aesthetic dentists have improved quickly in China. Around the year 2010, we were able to see a number of young dentists with excellent clinical photography skills. However, one flower is not thriving. All flowers bloom together in full in a spring garden. At that time, the early spring of Chinese oral aesthetics had come. Flowers bloomed all over the country.

I received the solicitation for the second edition of *Dental Digital Photography* in 2010. Due to my deeper understanding of clinical photography, I had already felt the contents of the first edition to be slightly lacking. Thus, I added lots of new content and revised the book carefully. After 4 months of hard work, the second edition of the book was published successfully in 2011. The achievement of the second edition was like a golden treasure. You can quickly get started with clinical photography by reading this book—just like mining a gold mine that you never set foot in before.

Dental aesthetics has been a focus of dental clinicians. Clinical photography technology is a necessary tool to record dental aesthetics treatment. The sales record of the second edition *Dental Digital Photography* was strong. It was out of stock several times in 5 years and reprinted many times. In recent years, an increasing number of physicians and lecturers have produced very fine cases, with fewer producing poor-quality photos. By the end of 2014, I began to assist the chairman of the Xing Wang by editing *Case Omnibus of Chinese Esthetic Dentistry 2015*. This book featured more than 100 high-quality oral aesthetics cases across the country. Some case photographs had me amazed. All of them showed that the treatment and photography skills of aesthetic dentists in China had greatly improved.



I enjoy the rapid change and promotion in our industry. When I demonstrated our capabilities and results to colleagues in Europe, the United States, and Japan, they expressed their praise and recognition. I was really proud that several case reports and my clinical thoughts were accepted by foreign dentists. Some of my articles have been translated into English and German were published in the foreign media. I believe we have a responsibility to demonstrate our skills on the international stage and enhance the perception of the Chinese in the context of the world.

Such recognition is enhanced when we established the Chinese Society of Esthetic Dentistry (CSED) with Professors Jianguo Tan and Cong Fan. In recent years, I have been involved in professional activities of foreign dental aesthetics society. Firstly, I participated in the American Academy of Cosmetic Dentistry (AACD). Then, I was enrolled in the European Society of Esthetic Dentistry (ESCD) and the Japan Academy of Esthetic Dentistry (JAED). For 2 years I served as the chairperson for China in the ESCD. During the process of contacting foreign counterparts, I felt more and more urgent that China needs its own oral aesthetic organization, when the Chinese Stomatological Association (CSA) aimed to set up such a subsidiary organization.

Finally, after nearly 2 years of preparation, the Chinese Society of Esthetic Dentistry was formally established in September 2015. Before the Institute was formally established, Professor Tan Jianguo told me that our Committee should work to promote the growth of the field by having more colleagues demonstrate the Chinese style on the international stage. After the founding of the first oral aesthetics Committee, one of the specific jobs was to establish the China Stomatological Aesthetic Standards (CSED), which are specifications on clinical photography aesthetics.

Why should we set up our own specifications? The AACD has its own clinical photography specifications that are widely acknowledged by oral aesthetics dentists. However, the ESCD believed that the AACD standards were relatively simple and had limitations by considering “beautiful” results without occlusal and function problems. Thus, they cannot meet the requirements of oral aesthetics treatment. Therefore, the ESCD developed its own specifications. Many European dentists recognize and follow the specifications of ESCD. By careful study, we found that the differences between AACD and ESCD were very obvious.

Which specifications should be followed by Chinese oral aesthetic dentists—the AACD or the ESCD? Experts from 15 professional colleges, 7 subspecialties, and 29 clinical doctors discussed this problem repeatedly. Combined with the requirements of oral aesthetics analysis, design, and demonstration, they created the CSED Specifications of Clinical Aesthetics Photography, which consist of 16 images.

I am responsible for the draft of these specifications. I am very grateful to Chairman Tan Jianguo for delegating the draft settlement to me. Although I was familiar with the clinical photographs, it was quite difficult for me to draw up specifications that meet the requirements of oral esthetics, just like Guyi Li (a famous singer in China) singing the song “Unforgettable Tonight.” To take advantage of this opportunity, I began to earnestly study and research with my team. I consulted with experts in other professional fields on various occasions. This was a great opportunity for me and my team.

Finally, when the specifications were drafted, I was very excited. Our specifications were different from those of AACD. They represent the improvement of dental aesthetic treatment concepts. CSED’s specification is similar to ESCD’s specification. However, there are still a lot of differences. The CSED specifications represent the clinical thinking of a Chinese oral aesthetic clinician. We can be very confident when showing our specifications to the world and spreading the idea of oral aesthetics concept from China.

While I was developing the CSED specifications, I received a solicitation for the third edition of *Dental Digital Photography* from the publisher. I felt that it was the right opportunity. With this opportunity, we combed through a variety of commonly used clinical images. We had to deeply think about dental photography and other areas related to clinical photography. All of these aspects were fully written and expressed in this revision.

There is a big difference between this revision and the first edition. I was informed that this book would be published in an English version as a classic monograph of the People's Medical Publishing House. This was a huge pressure on me, and also a huge opportunity at the same time. As far as I know, it is relatively rare for a Chinese dentist to publish their professional literature in English. This means that more foreign doctors will recognize and understand the developments in this field in China. This is consistent with the target of my Committee objectives.

In the process of finishing the manuscript, I recalled past events from the first edition of the book. Dr. Shan Jiang, Dr. Tongfeng He, and Dr. Liang Han and Dr. Huan Huang. Each of those familiar names has become a leader of in China's dental aesthetics field. Thanks to them for giving me the opportunity to mature from an unknown doctor. My powerful team consists of young doctors such as Yi Li, Xiaorui Shi, Tongkai Xu, Yu Tian, Xinran Liu, Shiming Liu, Xing Liu, Ying Wang and Tao Yu. It also includes doctors in private clinics, such as Bo Peng, Zhensheng Zhang and Wei He. Although we do not work together, we maintained close contact. All of them are solid supporters who helped to make my mission successful. It is my good fortune to have had the opportunity to learn from each other and promote common development.

I believe that the third edition of this book will gain the favor of oral aesthetic clinicians thanks to the joint efforts of everyone involved. I hope this book will help more clinicians and will be read by more foreign doctors, providing a clearer picture of the aesthetics of Chinese dentists in the world.

Finally, my special thanks go to Dr. Mingming Xu, deputy director at Peking University Hospital of Stomatology. She is my excellent partner in life and career. She always provides me with the utmost support and complete confidence by encouraging me to run all the way on my favorite road.

Beijing, China  
December 1, 2015

Feng Liu

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## Foreword to the Third Edition

—Praise for the third revised edition of Dr. Feng Liu *Dental Digital Photography*



In 2006, Dr. Feng Liu published his first edition of *Dental Digital Photography*. He finished the revision of the second edition in 2011. Today, presented herein is his edition of the third revision. The revised edition of *Digital Dental Photography* not only has been restructured from the original version, but a lot of new content was also added. Its theoretical approach is more systematic, more clinically significant, and more valuable.

Dental clinic doctors must accumulate complete image information in order to improve their clinical skills and achieve a higher level of research on the subject. At the same time, complete high-quality image data is essential to teaching. However, some clinicians lack sufficient knowledge. The effect of the academic report or teaching is greatly influenced by the image data, even arousing suspicion and doubts for their academic level. In recent years, due to the rapid development of digital photography, traditional film photography has been completely replaced by digital photography in the field of stomatology. A book on digital photography technology and its specific applications in the field of stomatology is very important for dentists.

Dr. Feng Liu has published more than 10 books in recent years. I have read some of his works, and I greatly appreciate his hard work and efforts. Dr. Feng Liu constantly improves his clinical technology by means of dental clinical photography. At the same time, he has shared the clinical data accumulated by clinical photography with colleagues. Especially in the field of aesthetic dentistry, Dr. Feng Liu work has received the recognition and affirmation of his fellows. *Dental Digital Photography* has become a tool of many dentists. Dr. Feng Liu works promote dental clinical research in China. He has helped to improve the level of clinical research.

People's Medical Publishing House will revise the third edition of the *Dental Digital Photography*, publishing and translating it into English simultaneously. It will be pushed to the foreign market, allowing more foreign counterparts to understand China and promoting international exchanges and cooperation.

I believe that the publication of this book is something to be proud of. I also sincerely hope that Chinese stomatology will be recognized by international colleagues, contributing to the progress of oral medicine in China.



Congratulations to Dr. Feng Liu on the publication of the third edition of *Dental Digital Photography* in English. I hope all dentists will benefit from reading this book.



Xing Wang  
Honorary Chairmen of Chinese Stomatological Association  
Beijing, China  
March 7, 2016

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## Foreword to the Third Edition




Digital technology has penetrated into all walks of life, bringing revolutionary changes in people's work and life. The emergence of digital medicine has greatly improved the accuracy and convenience of diagnosis and treatment. Dental digital photography is one of the embodiments of digital medicine.

In the process of diagnosis and treatment of oral diseases, it is necessary to treat diseases and restore normal physiological functions, as well as important to pay special attention to the aesthetic of face and oral morphology. Image data is not only the indispensable data for disease analysis and treatment design but also an important carrier for communication between doctors and patients, as well as for academic exchanges and technical training between medical peers.

We are very pleased to see that Dr. Feng Liu devoted himself to the research and application of oral digital photography more than 10 years ago, and edited and published the first edition of *Dental Digital Photography*. What is even more gratifying is that this book has been widely welcomed by readers since its publication. After a lapse of 5 years, the second edition was published. Today, after another lapse of 5 years, the third edition of *Dental Digital Photography* is about to be interviewed. Moreover, according to the plan of the People's Health Publishing House, this book will be used as a classic professional book and the English version will be published abroad in the same period, which is not common in professional books in China.

Dr. Feng Liu devoted himself to the clinical photography and cosmetic dentistry. He not only studied the book but also led the research and practice for dental aesthetic photography. He formed a professional team and worked with the experts of the Chinese Society of Esthetic Dentistry to develop the specification of "Chinese dental aesthetic photography," which has effectively promoted the development of cosmetic dentistry in China.

The author of the third edition of *Dental Digital Photography* is as many as 18, which shows that it is the crystallization of the wisdom and experience of a strong team. The content is richer, more novel, and perfect. Its guidance and promotion effect to the dental aesthetic photography and the whole dental field are more obvious. I believe there will be more readers who like it. In view of this, I would like to try my best to recommend it to our dentist colleagues.



Guanyan Yu  
Chairmen of Chinese Stomatological Association  
Beijing, China

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## Foreword to the Third Edition



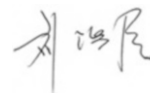
The third edition of *Dental Digital Photography*, edited by Dr. Liu Feng, has new content was revised from the previous edition. The book is divided into 9 chapters and 37 sections. It discusses topics such as the history and significance of dental photography, basic concepts and knowledge, basic techniques of clinical photography, clinical still life images, clinical operation images, image post-processing, clinical basic shooting, specifications for oral aesthetics clinical photography, and the selection and application of oral clinical photography equipment. A comprehensive system of presentation has been used in this book. Particularly because it is based on the application of clinical imaging in dental aesthetic treatment, the content of this book is practicable. It has strong implications for clinical guidance. It is a comprehensive book on dental digital photography in China.

Oral medicine, particularly oral clinical medicine, is a special industry. Collecting oral imaging in oral disease diagnosis plays an important role in the treatment. The role of the oral image cannot be replaced in prosthodontics, orthodontics, and the oral presentation of facial aesthetic design, restoration, and comparisons before and after the correction. It also can provide objective evidence of medical disputes. Therefore, oral photography is specialized professional knowledge and an important skill to be mastered by dental professionals.

The second edition of the book provides new knowledge and skills for the popularization and improvement of dental photography technology. It is a clinically useful reference book and is recommended reading for dental professionals.

Dr. Liu Feng is a hard-working professional with a unique perspective who continues to encourage young oral medicine experts. We are colleagues who cooperated in many societies and associations. He is on the Prosthodontics Professional Committee of the Chinese Stomatological Association (CSA), an executive committee member of the dental aesthetics sub-societies of CSA, and an executive committee member of oral plastic surgery in the branch of the China Association of Plastic Surgery (CAPA). Dr. Liu Feng was served as editor-in-chief for more than 10 of monographs about prosthodontics, oral aesthetics, and

photography, signifying his hard work. As a young promising scholar, he published three editions of this book in 10 years. The English versions will be released simultaneously, which shows his enterprising academic and professional spirit. I believe Dr. Liu and his team can provide us with more and newer achievements of professional theory and technology. We are full of expectations and confidence for him.



Hongchen Liu  
Vice President of the Chinese  
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Vice President of the China  
Association of plastic surgery (CAPA)  
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March 30, 2016

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## Foreword to the Third Edition



About 10 years ago, the young Dr. Liu Feng presented me with a gift: a copy of his newly published book—the first edition of *Digital Dental Photography*. It aroused my interest immediately. First of all, I had begun photography as a hobby at that time. A book combining photography and the dental profession certainly met my taste. Secondly, I was not familiar with Liu Feng. After that, I learned that he was a young talent in the first outpatient department in our hospital. When I received the book from him, I had a fleeting thought: “The author who published this monograph is so young.” However, after I read it, I realized it was a rare good book.

The author combined the basic concepts of “photography” and “medical photography” with clinical applications. It discusses basic concepts, practical technology, and equipment for medical photography, while presenting various types of oral clinical photography through real stories and pictures to readers. The development of oral medicine in China is foremost. Various technologies and new therapies are described throughout, with clinical developments summarized for the general trend of international practice. The book includes a collection of clinical data, especially in the field of oral aesthetics treatment, which is in line with the academic and aesthetic standards of foreign counterparts. The publication of *Dental Digital Photography* meets all requirements and is highly respected.

Subsequently, the author published several books related to the clinical practice of oral aesthetics, including *The Clinical Practice of Oral Stomatology Aesthetics* and *Case Omnibus of Chinese Esthetic Dentistry 2015*. Dr. Liu Feng showed me a sample of the third edition of *Digital Dental Photography* a few days ago and invited me to write a preface for his book. I majored in oral pathology and am rarely involved in the practice of clinical photography operations described in this book. However, based on the above opportunities, I gladly accepted the invitation.

Dr. Liu Feng’s exploration and assiduous spirit in dental photography is very prominent in our Peking University Stomatology Hospital. He is a doctor in the prosthodontics department. Photography is his hobby. He is one of the few experts in our hospital in the field of oral aesthetic treatments with multidisciplinary collaboration and exploration. He has a keen grasp of

the subject of clinical photography, which is closely related to the clinical practice of oral medicine. “From heart to hand,” he published this book with his enthusiasm and experience. He shared them with readers in a timely matter, with perseverance and constant expanding progress.

The content of the book is updated with each version. Each new book accompanies and witnesses his academic growth. This is commendable in the physician. In our daily lives, we often look forward to finding love in the most beautiful years. Similarly, in a dentist’s career, it is very common in the most passionate and formative years to pursue professional dreams. I always believe that there must be feeling in writing. The author must move himself firstly, then have the opportunity to move his readers. I can feel Dr. Liu’s passion in the third edition of *Dental Digital Photography*.

The birth of photography was more than 170 years ago. Human society has experienced a remarkable visual revolution during these years. Some people have even compared photography with printing in the progress of human civilization. Photography has established a close relationship between visual and reality, which helps us to achieve a variety of visions never reached, such as off the beaten track of the scenery or famous people that we never met.

Medical photography is an applied field of photography. It objectively records the process of scientific activities of medicine. It is an important means of information collection, storage, and display in medical research. A picture is worth a thousand words. The role of medical images in medical research cannot be replaced. Clinical stomatology is a medical discipline with more practical operations. The dentist can record the patient’s mouth and extraoral areas in real time. The image is used for case analysis, treatment design, efficacy assessment, communication and display, data storage, and more. This has become a part of the daily work of general practitioners. Particularly in recent years, with the rise of aesthetic dental treatment, the requirements for the technical specifications of clinical photography are greater. Therefore, the publication of the third revision of *Dental Digital Photography* is necessary and timely. The author added specifications for clinical photography in the United States, Europe, and China in the new version. The English version will be published simultaneously. I think this is an objective reflection of our oral medicine development—from flourishing to standardized, from sporadic introductions to international standards. Medical teaching and research work are examined with an international view and consciously comply with “rules” in daily work. The rules become habits. The professional level can be upgraded through exchanges and continuity, ultimately enhancing the discourse power of our counterparts. I believe that the new version of *Dental Digital Photography* will promote the dental clinical practice of medical image collection, processing, and applications.

The power of images is huge: “Seeing is believing.” I hope that colleagues in all aspects can pick up the camera, then record and witness every detail. I hope that *Dental Digital Photography* will always accompany you as a tool on your journey.



Tiejun Li  
Vice-Dean of Peking University  
School of Stomatology  
Beijing, China  
March 23, 2016

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## Preface to the Second Edition

I wrote the preface for the second edition with less excitement and more calmness. Early in 2011, I received a solicitation for a revised edition of *Dental Digital Photography*, which had been published for 5 years. It has been more than 10 years since I first applied photography in dental clinical practice.

Several thousand copies of the first edition of *Dental Digital Photography* were sold in the past 5 years. I believe that tens of thousands of dentists have read it. This book helped many dentists to recognize the importance of clinical photography, improving their abilities to take a standardized clinical photography image. However, I also benefited from this book. Through this book, I was recognized by many predecessors and colleagues even though I was an ordinary dentist from the Peking University stomatological clinic. I also was presented with opportunities to improve my skills through my numerous communications with readers.

*Dental Digital Photography* was a step to a new level of my career. I deeply thank my teachers Dr. Tan Jianguo and Dr. Guo Hang who gave me this opportunity. I also thank Dr. Jiang Shan, Dr. He Tongfeng, Dr. Huang Ju, and Dr. Han Liang, who helped me to complete the manuscript of this book, as well as the teachers of the People's Health Publishing House.

Five years ago, oral clinical photography seem to be very profound knowledge. Many clinical doctors who used SLR cameras found the distance of a macro lens to be too far. They were at a loss with DSLR. Five years later, almost every department of every professional college has several cameras. Almost all large stomatological hospitals are equipped with DSLR cameras. The dentists who pursue this professional are keen on clinical photography and have mastered these skills.

A few years ago, Chinese stomatological doctors would be criticized for insufficient clinical photography skills when they spoke at international academic conferences. Today, the clinicians with the most advanced level of skills at various types of international academic conferences are Chinese. Clinical photography is no longer a weakness of Chinese doctors.

The concept of dental photography has been accepted by most dentists. Clinical photography has become an integral part of the daily work of many oral doctors. The popularity of its rapid expansion is beyond the imagination. Every time I think of these variations and developments, I am proud of my contribution to the development of the field of oral medicine in China.

Of course, friends and readers have alerted me to the shortcomings of the first edition in the past few years. For example, some chapters were too refined and readers had some difficulty understanding them. Some chapters needed to be enriched to provide a deeper understanding for the reader.

With this opportunity to revise the text, I added lots of content that should interest many readers. In this way, a dentist who has no basic experience in photography can better understanding the field. At the same time, I made a thorough analysis to eliminate any confusion and disagreement for dentists who have shooting experience.

The book is dedicated to my stomatology colleagues. I hope it will be helpful to general dentists as well.

Beijing, China  
June 12, 2011

Feng Liu



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## Foreword to the Second Edition

I am glad to see the second edition of *Digital Dental Photography* reprinted by Dr. Liu Feng after a lapse of 5 years. The second edition is not only an acknowledgement of his hard work, but it also shows a greater interest in aesthetic dentistry. From another perspective, it reflects the rapid development of the field of Chinese stomatology.

Compared with traditional photography, the images of digital photography have the advantages of being high quality, easy to store, easy to transmit, and low cost. It has become a necessary auxiliary tool in aesthetic dentistry. It faithfully records the patient's stage in the process and research treatment options. It is very important to improve the quality of health care. A valuable photograph not only facilitates communications between doctors and patients, but it also improves the efficiency of diagnosis and treatment. It is the most convincing method for the technical exchanges between colleagues.

As a general practitioner at Peking University School of Stomatology, Dr. Liu Feng established breakthroughs in the area of dental aesthetics. He expands his research field by using his spare time to study assiduously. While fulfilling medical teaching and research, he took ordinary photos of patients as a starting point. He has made certain achievements. Each young dentist should learn from his spirit, in accelerating the construction of talent in today's country. He has firmly established the concept that everyone can become a successful dentist and always keep a sense of innovation.

The youth are the hope of our cause. Peking University School of Stomatology will provide a platform for young dentists to create opportunities. A large number of young dentists can emerged on this platform continuously.

I believe that this book will be useful and helpful to dental practitioners.



Tao Xu  
Dean of Peking University  
School of Stomatology  
Beijing, China  
June, 2011

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## Preface to the First Edition

—To each dental colleague who pursues excellence

Although I have published a lot of papers about dental digital photography in a variety of professional journals and newspapers, it took me more than a year to draft *Dental Digital Photography* from the topics identified to complete publication. I consider this book to be a special gift for my 10 years of dental experience.

As a young dental doctor, I was presented with the opportunity to publish this monograph as editor-in-chief. All of these works have benefited from the vigorous support of the leaders of the outpatient department at Peking University Stomatological Hospital. With their support and training, I had the privilege of obtaining a professional SLR digital camera. This opportunity provided me with the chance to practice dental digital photography. By combining my clinical experience with the photography equipment, I advanced my photography skills to a professional level, and I was recognized and affirmed by many colleagues and predecessors in the industry. Through the publication of this book, I am able to share my knowledge and experience with the readers. I hope to promote the practice and application of dental digital photography, along with the rapid development of dental aesthetics.

With the growth of the economy and improved living standards, more people have begun to pursue physical excellence. Some people went on a diet and fitness regimen to get in good shape at the expense of sweat, hunger, or even medicine and surgery. Some people went on an operating table for cosmetic surgery to change their appearances. Many people also recognized that a perfect smile will improve their appearance. We are engaged in the work of oral aesthetics to help people obtain a more attractive smile. This is a very popular field of dentistry.

The smile is powerful and expresses a positive state of mind. A sincere smile represents a peaceful heart and happy mood—an optimistic attitude of life. The smile shows that the heart is full of sunshine and a person has confidence. A professional smile can also show a spirit of dedication. A smile is able to provide a sense of beauty to others and provide ease to ourselves at the same time. A smile is a silent greeting that can sow seeds of friendship between people.

The smile of Mona Lisa is representative of the Western smile—mysterious and beautiful. As the lyrics of song “Smile of Mona Lisa” goes, “Her smile is so mystery so beauty.” Vairocana Buddha’s smile in Longmen Grottoes is typical of the Oriental smile. Integrated with wisdom, nobility, and peace, the smile will make the whole world quiet. When you are lonely, depressed, and sad, just focus on their smiles. In a moment, your heart will be at peace like water, still and warm.

Smiles are very important. The goal of dental aesthetics is to help patients have more attractive smiles. Because the smile reveals teeth, teeth are an important part of the smile. Dental aesthetics is a complicated specialty. An oral aesthetic doctor not only has professional knowledge of stomatology, but also understands aesthetics, psychology, color, and other humanities. Dental aesthetic treatments include knowledge from the departments of prosthodontics, endodontics, orthodontics, periodontology, and implanting. They help patients optimize their smiles to enhance their charm through the integrated “smile design,” making full use of various treatments. This is a beautiful process. The dentist should be sensitive to the patient’s desires.

Therefore, dental aesthetics is different from other dental treatments. It is not only a professional technical job, but also an artistic endeavor. The requirement for dentists is higher.

To expand their business and take advantage of a larger market of patients, many dentists have begun to perform oral aesthetic treatments. However, does it mean they are qualified to practice oral aesthetics after mastering the techniques for tooth bleaching, resin filling, porcelain crowns, veneers, and other treatments? How can we understand more deeply the flexible concepts of aesthetic design? How can we more quickly and more accurately carry out aesthetic analysis and aesthetic design?

A dentist may master the skills for fillings, tooth extractions, and even porcelain crowns. However, that alone does not really bring "beauty" to the patient. An excellent dental aesthetic clinician also needs good aesthetic consciousness and aesthetic quality. He or she needs to understand aesthetic psychology at the same time. We need an aesthetic sensibility and artistic temperament.

What does it mean to have a sense of aesthetics and an artistic temperament? Firstly, aesthetic consciousness is the ability to discover beauty. It is a kind of sensitivity to beauty. Ask yourself: Can you find the little bit of beauty in your daily life? Would you appreciate the beauty of the first green of spring, summer, flowers, brilliant autumn, and winter snow? First of all, a dentist who strives for excellence in oral aesthetics should be full of passion, love life, be sensitive to beauty, and appreciate artists and musicians.

Where do the aesthetic consciousness and artistic temperament come from? Is it inherent in you? Indeed, some people are full of an artistic sense, romantic temperament, and a strong ability to grasp the beauty of nature. Their aesthetic quality is high. They can easily achieve aesthetic creations. However, such genius is rare. Most people—including myself—do not have such genius. To better complete the tasks of aesthetic creation in dental aesthetics, we need to constantly watch for aesthetic qualities in our daily lives to improve our ability to grasp beauty.

If you have sensitivity to beauty, you will always appreciate and understand beauty. Furthermore, you will sensitive to flaws. After we discover the aesthetic defects, we can create beauty. This is the basis of successful fulfillment of the tasks of oral aesthetics. There are many ways to develop our aesthetic qualities. Aesthetics in daily life appear in many forms, such as paintings, dances, sculptures, architecture, and other arts. Even food contains a lot of beauty. Conscious touching, appreciation, and thinking can improve our aesthetic quality.

Is there any effective and immediate way to train your aesthetic sense? Photography is a very good and effective way to cultivate this skill and improve your aesthetic consciousness. Photography can help us to capture and reproduce beauty. Through photography, beautiful scenes or figures can be solidified into a beautiful picture. Photography is the perfect combination of art and technology. Expressed through photography, we can show the goodliness that the ordinary people do not pay attention to. In fact, dental aesthetics is the perfect combination of dental technology and artistic design to achieve a therapeutic effect of "more beautiful, more natural." Therefore, photography and dental aesthetics have a great deal in common. In addition, the aesthetics of photography is an important technology. It plays an important role in dental aesthetics. Therefore, to fulfill the task of dental aesthetics, photography should be learned first!

In my 10 years of working experience after college, I obtained rapid growth in the field of dental aesthetics thanks to a keen sense of observation, recognition of the important role of dental photography, purchasing of photography equipment, and efforts to study photography and dental aesthetics. I hope more of my young and ambitious colleagues will recognize the importance and necessity of dental photography in oral aesthetics. By reading this book, I hope you can quickly advance your professional skills.

Because of the limitations of my knowledge and experience, there will inevitably be some omissions in the book. I welcome comments from colleagues to correct and enlighten me. I thank you!

Beijing, China  
January 19, 2006

Feng Liu

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## Postscript of the Third Edition

Mark of time.

When the news broke that Leonardo DiCaprio won the award for Best Actor at the 2016 Oscar ceremony, Leo's fans celebrated all over the world. He was nominated for the award for the first time at the age of 19. After that, it took him 22 years to get approval from the academy.

In the year 1997, the second year after my graduation, the movie *Titanic* swept across every cinema in the city. It touched that young heart of mine with its breathtaking scenes and sad, beautiful love. Although almost every young man was attracted to Kate's charm, Leonardo was even more attractive with his handsomeness. Leonardo's name spread all over the world. He became an idol for many men and women around the world. However, this fame did not bring him an Oscar—not even a nomination. The Academy of Motion Picture Arts and Sciences did not accept Leonardo.

Almost 20 years passed by. No longer a beautiful young man, Leonardo has become an uncle quietly. He has played in tons of great movies—none of which ever brought him an Oscar. However, just when Leonardo found inner peace in life and perfection in his acting skills, he finally got the Oscar. Time has changed the innocence in his eyes to firmness and reservation in his brow. Time has left on the face of this man, and also everyone's heart.

Five more years just flew by. After 3 months of seclusion to complete revisions, the third edition of this book was finally completed. From tentative words in the first edition to smooth discourse in the second edition, to deeper thoughts in the third edition, *Digital Dental Photography* is finally approaching its maturity.

The aim of this book is to direct beginners on the use of a tool and to help advanced practitioners reach a clearer vision of dental photography. Because the English version will be published at the same time, this book is not only supposed to introduce international development in this field to Chinese audiences, but also to present the current situation and developments in this field in China to the world. The task of this book requires a superior writing level, which has made the revision difficult.

Fortunately, time has firmed my confidence a bit.

The 20 years after graduation has passed in a flash. I just went through the midpoint of both my life and career. The struggling young man, who even forgot to eat or sleep, has become a man who is leading a growing team in his middle age. The satisfaction brought by the growth of myself and my team members speaks for itself. I have tasked myself with learning and bringing foreign advanced technologies home. Now, I am promoting developments and ideas from China abroad so that the world will see them. A strong mind and mature thoughts have brought me peace and calm. However, a relatively young look and inner peace, which is a little too quiet, sometimes creates apparent differences, even to myself.

Recalling the past 2 decades, I am glad that time has marked my face lightly. However, I am even more grateful that time has marked my heart and soul unreservedly.

After three months and nights of revision, today the book is finally finished. I have to hand it over again, and my mood is a little excited. Because this is a book that will face the world. At the same time, my mood is also a bit embarrassing, because it is a book will face the world and to a certain extent, it may represent China's development in this field. But I think, this may become a normal state in the future.

Today is an interesting day, only once in every 4 years. Just stop here. The uncompletely, unfinished expression, let them be left to the next book, or the next edition. Then, time and tide will leave us more marks, and we may have a wealth of ideas and profound thoughts.

Late at night, I look forward to the rise of the sun tomorrow, also the experience of the flow of time and the appreciation of life in full blossom.

2016.2.29

Feng Liu

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## Acknowledgement

All the imaging models and patients in this book were aware that their images would be used for teaching and publication. Signed informed consent was provided.

# The History and Significance of Dental Photography

Feng Liu, Mingming Xu, and Tongfeng He

The photography can capture and reproduce the beauty in our life.

The photography is the perfect combination of art and technology which could even exhibit the beauty that ignored by people's eyes.

When shooting, we use our eyes to see, our hearts to capture and brains to think; so the photography can cultivate our understanding of beauty, improve our ability to perceive beauty and help us to create more beauties.

## The History and Development of Photography

Photography is a process using optical imaging and other scientific principle to reflect or document real scene as the planar images. According to the different imaging methods and effects, the sub concepts of photography can be divided into picture photography, film photography and television photography. Picture photography, accompanied by the birth of photography, is the traditional definition of photography. Besides, the phrase picture photography is the synonym of "photography" in the narrow sense. The picture photography refers to the photography which uses the camera as the main tool to record or reflects the real life into the planar images. The outcome acquired by the picture photography is commonly known as "photo" or "image".

## The Birth of Photography

In the period about 400 BC, a philosopher from the ancient Han Dynasty of China named Mo Di discovered the phenomenon of pin-hole imaging and recorded it in his famous

book, the "Mozi-jing xia", which is the earliest research and work of pin-hole imaging in the history. This discovery laid the theoretical foundation for the invention of photography. After the documentation of Mo Di, the pin-hole imaging phenomenon has been discussed a lot by various scientists include the Aristotle, the philosopher in ancient Greek; Euclid, the mathematician in ancient Greek; Han Feizi, a legalists in the spring and Autumn Period in China; Liu An, the lord of Huai-nan in the Han Dynasty; Shen Kuo, the scientist in the Song Dynasty and so on. During that period, the pin-hole imaging has been discovered and even applied. However, all of these can just be used in observing but unable to record [1, 2].

Today, though the modern photography has been well established, there are still some photography enthusiasts, who are in favor of pin-hole imaging technology, design, manufacture the cameras which based on the principle of pin-hole imaging individually and shoot the images with special style.

In September 2012, the author came across an enthusiast of the pinhole camera at the Brandenburger Tor Square in Berlin, Germany, who was taking the panorama with his own homemade pinhole camera. After 40 min' exposure, the panorama of the Brandenburg Tor Square was acquired.

Since the history of our human being developed, the human beings have been used the means of painting to record the objective things. But humans have always felt that it is not satisfied, and have been looking for methods that could faithfully record the reality. In 1725, on the basis of the obscura, which was widely used by the painters at that time, German Professor Schultz from the Adolf University tested the photosensitivity of the silver nitrate. In the beginning of nineteenth century, British inventor Thomas Wedgwood made the first known attempt to capture the image in a camera obscura by means of a light-sensitive substance, which pushed the study of photographic chemistry forward greatly. However, due to ideal solvent for the silver nitrate was not found, the images that were taken at that time neither cannot be fixed nor be preserved.

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In the history of world photography, the first permanent photo etching was produced in the summer of 1826 by the French inventor Nicéphore Niépce (1765–1883), who had invented photography and printing plate [3].

Niépce was a former administrator of Nice in France, who lost an eye during the French-Italian War (1793 AD). In 1822, he began to study the bitumen photosensitive plate, which was a method for photo etching. The bitumen photosensitive plate was the technique which use a Pewter plate coated with the bitumen of Judea for photographing, after 8 h' exposure, the unhardened part of the plate was washed away and then the black metal plate was used as substrate, so that same scene that was photographed would be shown on the plate.

In 1826, Niépce putted his photographic plate into the camera which was made by the Paris optical mechanic Chevalier, and photographed "View from the Window at Le Gras", the earliest surviving photograph in the world. The scene in the photographic image was the roofs outside of window which taken from Niépce's home. At present, this photographic image is collected by the Harry Ransom center in the University of Texas at Austin. The photographic method that he had invented was coined as "heliography", which has been generally used for the printing plate after later improvement. So the industry of printing plate all over the world respects him as a great inventor of printing plate.

However, this invention the invention has not received official recognition in the field of photography. In the September of 1827, the British artist Bauer invited Niépce to deliver a lecture at the Royal Society; at the mean time, the King George IV of Great Britain and Ireland was also being invited for presence. This was an important opportunity that the invention was able to be understood by the public and be recognized officially. However, Niépce who has been always cautious did not keep the appointment. Therefore, such action made the King and the authorities very disgusted, thus denied the importance of the invention of Niépce.

After that, lots people have studied and improved the equipment, materials and methods for photography tirelessly.

In 1837, German scientists, mineralogy Professor Kobell (1803–1875) and mathematics professor Steinheil (1801–1870) in University of Munich, claimed that they have invented photography and the fix agent was ammonia. However, in the historical documents, their invention was just the photographic plate but not the real photo. The four plates that invented by Professor Kobell are still collected by the Nation Museum of Deutschland. The content of these photographic plates was the architects in Munich.

The most splendid time in the history of the World Photography was 1839, when the French painter Louis J M Daguerre (1789–1851) invented the technique of silver plate photography.

In 1829, Daguerre met Niépce and then established the partnership relation between each other. On the basis of Niépce study, they have studied and researched the techniques of photography and photosensitive plate together. Niépce died in 1833 and Daguerre continued the experiments independently. Daguerre putted the light-sensitive into the camera, and then let the plated exposed by the light which projected through the lens; after that, the image was developed by the mercury vapor in the mercury develop box and "fixed" with hot saturated salt water. After all these steps, the photographic image that could preserve permanently was formed.

On January 9th 1839, Daguerre announced his invention at the French Institute of Science; and this made his technique become the first photographic technology, which is widely recognized in the human history. The technique was also named after himself—as the "Daguerreotype".

This method was more practical then the initial technique which invented by Niépce. For Niépce's first permanent photo, the exposure time was 8 h; however, the exposure time was only 20–30 min with Daguerreotype. Besides, more clear and bright images could be acquired by the Daguerreotype.

The Daguerreotype has been developed and evolved continuously. On 19 August 1839, Daguerre invented the vaporized silver halide development, which reduced the exposure time to several minutes. And when the solution of sodium thiosulfate was used to replace the hot saturated solution of common salt, the image on the silver plate could be retained for a longer time but not vanished. Daguerre then acquired the patent of the Daguerreotype and won the medal from French Parliament. The day when Daguerre received the medal was identified as the birth date of the photography.

After its birth, photography soon became popular throughout whole world. Some books later have depicted the situation at that time: "The sudden emerged of the photography technology in the calm and complacent Vitoria era of Europe was just like an exploded comet. Daguerre published the complete working instructions of his invention in 1839. And within few months, there has been a new industry, new technology, new art form, new style and new pop. The optic shops (where lenses could be purchased) and Pharmacies (where developer and fixative were sold) were all crowded with the enthusiast of the photography, whom was eager to buy their own camera and light sensitive plate."

## The Significance of the Photography

Photography is one of the great inventions of mankind in nineteenth century. Photography could not only extend the vision of human's eyes, but also be able to make an instant moment eternal. So in a sense, the desire of making the

time stop passing can be achieved by photography. After the birth of this epoch-making technology, the human kind enriched the concept and connotation of esthetics and art. Human's pursuits of intellectual and rational are also being promoted by the birth of photography. Just because the birth of photography, the education of the knowledge and the spread of the thoughts are not only relay on the medium as words, painting or sound, but a new, vivid and accurate media. The improvement on the spiritual level of the whole human being and changes of the political, social and cultural ecological could even equivalent of the medieval Ideological revolution, which brought by the emergence of printing.

Just like the birth of the new tools as telephone, automobile and airplane, the photography was born as a tool and a technology. However, it has not only extended into many fields of human life, but also entered the spiritual world of human beings as a form of consciousness. More than 100 years after the birth of the photography, the visual society this combined by the film, television all kinds of video information media, and internet connection has formed gradually, which has become the one of the most important carriers of today's human communication.

### **Establishment of the True Visual Relationships**

Because of the appearance of photography, the history of human beings seems to be naturally divided into "ancient" and "modern".

In the visual history, the characters that were born before the emergence of the photography are all belong to the distant "ancient". Such as the masters like Montesquieu, Voltaire, Rousseau and so on, though there was less than 100 years between their death and the birth of photography, the figures that had left for us were all in wigs, with the different expressions as dignified, wise, tranquil or solemn.

However, there has no significant difference expression between their portraits and portraits of Socrates, Plato and Aristotle, who had lived 2000 years ago. This is the limitation of the painting, which can be concluded as similar "ancient" figures were painted via different painting methods and styles.

For a painting, no matter how realistic or how vivid it is, it is difficult to obtain the equivalent sense of reality which given by the objective vision. When we admire excellent paintings, we often wonder involuntarily as "this image looks just like the real scenery or real people". However, when we see the character photos, we may blurt out as "this photo is amazing." The words "like" and "is" make the clear distinctions of the distances between the painting, photography and the realistic world.

Benefited from the photography, character's features as Darwin's rounded head and long beard, or Einstein's mane like hair and eyes of persistent inquiry had become the repre-

sentative symbols of these characters. Differed from the previous paintings, these photos could not only record the mental status of the moment they were shooting, but also retained their complete real image as unique living bodies in the world. So this kind of realistic feeling could give the viewer the feeling of "real".

The birth of photography had a dramatic effect on the traditional painting and sculpture, which made the conservative art form stride forward to the modern art in the middle of the nineteenth century. The revolutionary influence of photography on the arts is the promotion of the fundamental changing and reconstruction of the western modern art concepts. The birth of photography also brought a great impact on the styles and genres of Western painting art, which liberated the method of expression from the historical figurative expressionism and pushed the painting to a boarder art space. Susan Sontag has commented as: "...it is arguable that the existence of photography may well have liberated art from certain mimetic or imitative functions, so that painting, for instance, moved towards those modes described as Impressionist, Symbolist, Expressionist, Constructivist and Abstract."

Before the emergence of the photography, the mainstream of the western painting was classical realism painting, which pursues natural and realistic, with rigorous picture modeling. After the appearance of photography, the mainstream of the western painting altered as Expressionist and Impressionist, which the picture would rather shows the painter's subjective emotions but not entirely use the mimetic as the ultimate standard. So, it can be said that photography has played an irreplaceable role in the changing and reconstructing concepts of the western modern art.

It can also be said that, photography has established a substitutional relationship closer to truth between the human beings and the reality.

Before the birth of photography, the detailed description of the products and customs all over the world can only be achieved through words and pictures. However, these kinds of descriptions cannot provide the feeling of real and experienced which only photography can convey. After the birth of photography, the photography would help us to reach the place visually where human technology can achieve. For example, on the moon or in the space, the universe and the astral world, the camera lens could help us to achieve the dream of seeing or even somehow "experience personally".

In addition, sometimes the photography would reflect the details which our eyes may neglect or difficult to observe clearly. Take the Florence's David for example; you may not feel the sense of dignified when you see the real statue, however, the close-up shooting on the David's face from different angles could give different expressions as the sense of dignified. That is just because the photography could let the viewers to see the details that were neglected when observing,

and the details are difficult to be found even you are personally on the scene.

### **Cultivation of Intelligence**

Printing is one of the most significant inventions in the human history. Because printing could increase the number of a single book that makes more literate people have the opportunity to receive education. Photography has further reduced the threshold of human education, for people could understand the meaning and connotations inside of the photos even if they cannot read. Therefore, photography has a wider range of educational functions than words, which could give more opportunities of general education for human beings.

Among human beings, the number of people who cannot read is often more than who is literate. And among those adults who are literate, the quantities for those who are no longer reading or do not have long-term reading habit are always larger than those who reads regularly. Especially in modern people, many of us treat browsing the web, mobile phone message as reading. However, no matter how people browse the web or read the text message, visual psychology would makes people always preferred to watch the photo in the first place or to get the information mainly from the images. In the modern visual society which is based on the photography, the images can be found all over the places including the Internet, newspapers, books where the vision could reach. Regardless the education level, the time spent in education, the vast majority of people can read the information which the photographer wants to deliver, so that satisfaction and improve the intelligence can be obtained.

### **The Establishment of a Rational**

Since the birth of photography, for more than 170 years, the modern human history is accompanied with the continuous wars. Especially in the twentieth century which has just passed away, the losses and causality cause by the wars that human has endured was unprecedented. The photography has been keen to record everything that can be visual contacted since the birth of itself. The scenes in the daily life have never been neglected by photographers, and the historical events with special significance have attracted the viewpoints of lots of photographers. No matter the artificial reasons or natural causes, the disasters and misfortunes in photography could always attract the attention of the readers. The disasters and misfortunes have promoted the value and target of photography from the simple pursuit of beauty and art to the pursuit of truth. So that photographing the truth has become one of the standards of photography. At the same time, photography has infiltrated into all the aspects including political events, culture, social customs, or the public psychology and so on.

## **Photography in China**

In the period of feudal society, due to the long-term adherence to the policy of isolation and closed, it was difficult to rapidly introduce the advanced western technology and science into China.

Even if the science or techniques can be introduced into China, the feudal forces would strictly restrict the development and dissemination of these advanced things. However, at the time when photography has been invented and developed, China has already entered the initial stage of semi colonial and semi feudal society. Therefore, under such particular historical condition, photography was spread into China just few years after its invention.

Shortly after the birth of photography, the First Opium War (Anglo-Chinese War), which was a war between the United Kingdom and the Qing dynasty over their conflicting viewpoints on diplomatic relations, trade, and the administration of justice for foreign nationals in China broke out. In 1842, the British and Qing governments signed the "Treaty of Nanking", which designated five treaty ports (Guangzhou, Shanghai, Ningbo, Fuzhou & Xiamen) and ceded the Hong Kong Island as the indemnities to Britain. The Preferential tariff agreement has attracted a large number of foreign businessmen, missionaries and other people of all hierarchies to China. And In the increasingly frequent diplomatic, economic and trade exchanges, photography has been introduced to China.

There were some written records at that time which documented the early scenes when the photography was introduced into China. In 1846, there was a noticeable advertisement published on a local newspaper in Hong Kong, which written: "the black-and-white or colored photos of Hong Kong and China are sold by the Hong Kong silver plate photography and zincography company." This was indicated that the photography had become a business at that time in Hong Kong.

The application of the photography in China has also appeared early in the field of Qing government's diplomatic activity. According to the relevant documents, the Viceroy of Liangguang area and the trade minister of the five treaty ports—Qi Ying, who was also known as the first diplomat of China in history, had accepted the photos of the Henry Pottinger himself and his family during the contact with Sir Henry Pottinger. For at that time, presented their photos had become a kind of etiquette in the diplomatic activities.

In August 1844, when Qi Ying attended the negotiating contract in Macau with the French envoy Marie Melchior Joseph Théodose de Lagrené, officials from Italy, Great Britain, United States and Portugal asked him for the "small pictures"; so that Qi Ying sent his pictures as four copies to these officials. After that, In his letter to the emperor, he documented such experience as "four officials asked me to give my personal pictures to them, and I met their requests."

The phrase “small picture” was a Chinese old term, originally was what people call the portrait painting. And after the introduction of the photography, this phrase was used to call the portrait photography. Empress Dowager Cixi has also paid great interest in taking the “small pictures” and took lots of pictures in the Summer Palace.

Before 1860, the spread and application of photography in China were limited to the southern coastal provinces. In the north of China, foreigners were not allowed to enter at that period, so the people there were still ignorant of photography.

Less than 20 years after the signing of the “Treaty of Nanking”, the Second Opium War (as known as the Anglo-French expedition to China) broke out. During the war, the British and French army marched into the inner land of China, attacked and captured the important northern city, Tientsin; and the capital city of China, Peking. Therefore, the photographers whom marched with the army have brought the photograph to the northern areas of China. The local history in Tientsin described the scenes that the photographers were used to take photos in Tientsin. The book “Records of Tianjin” have documented as: when the British entered the city of Tientsin, they had rather ambitious and cautious. The situations as the widths of the rivers or the heights of the walls were all recorded by writing and painting. And there was unique person who took a block of glass that was smeared with ink and lead. When he wanted to shoot anywhere, he would shoot it with the wired glass. Then, he would wash the ink and lead away by water, and an amazing picture could be formed on the glass. The buildings as towers, temples and attics were all captured by the glass.

Around the year 1860, in order to reap benefits, many foreigners opened photo studios in the cities like Guangzhou and Shanghai. A scholar of the Qing Dynasty who named Ni Hong made a rather interesting and vivid record to document the situation which foreign photographer started up the photo shops at that time.

There was a poetry that was written in 1861, and the content of the poetry is translated as below.

The shadow of the sun shown that was about noon, a piece of glass was used as the photographic plate, and the potion was applied on the surface of the glass; then the glass was put into a box which contains the machine which covered by the 6-feet cloth. On the box, there was a hole which as big as a bowl to see the things. After that, the image of the full length portrait of the people could be seen on the glass after just less than an hour.

The poem depicted a foreign businessman in Guangzhou opened a photo studio, who could shoot the portrait without painting. The photographic method in the poem was wet plate processing; the portrait which taken by this method could be persevered without fading or blurring for a hundred years. Moreover, it is documented that local citizens rushed to take pictures, and the owner of the camera shop had earned lot of money so that “the money could fulfill a cart in a day.”

After the emergence of the photography in China, it has attracted more and more attention. At that time, before the photography was introduced in China, the people had to ask the painter to draw the portrait on the paper, so that their figure could be preserved. The pictures for the living people were named as “Xiao Zhao”, and the pictures for the dead were named as “Ying Xiang”. So in Chinese, the phrase “Zhao Xiang”, which means taking picture, was formed by taking a character from each word and combined them together. In that era, there were lots of professional painters whom set up the “image shops”, to meet the needs of the public. After the appearance of the “Photo studio” in China, because the photography has the advantages as lower price, more convenient and more vivid when compared to the painting, more and more customers had selected photography. Thus, the photography has caused a great threat to the picture industry. So that many artists tried to study photography and changed their occupations as photographers. In the photo studios, which opened in the early stage, many photographers were painters who were forced to change their occupations.

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## The Characteristics and Development of Medical Photography

The medical photography is a specialized area of photography that concerns itself with the documentation of the medical subjects (covering the microscope, anatomy, pathology, X-ray film, clinical, scientific experiments, etc.). Medical photography is a branch of traditional photography, and it is the combination of the photography technology and medical science [4]. For medical photography, the “medical” is the premise, essence and the main body; the photography” is the object which subordinate to the medical. In a word, the medical photography is the specific applications in the medical field of the photographic technology.

Unlike the general photography, the medical photography is an important means for the collection, storage and communication of image information in medical research, disease control and education [5]. With the development of medical science and technology, the change of medical model has brought new problems and new challenges to medical photography. Modern medical photography needs to adapt to the needs of the times, so that it can serve the clinical treatment, education and research better.

For the medical works, the records of the medical photography are the image information of the diagnosis, the image records during the diagnosis and treatment, and the image documentation of the cases. For the medical education, the records of the medical photography are the visualized demonstrations that could make people to understand the process of diagnosis and treatment of cases vividly. For clinical



researches, the images could record the whole process of medical research and provide a scientific basis for the results of the researches as the authentic and vivid data in the research [6, 7].

## The Characteristics of Medical Photography

Medical photography is a kind of photography which serves the medical field. It is objective, opportunity related, comparative, informative and artistic. Authenticity and objectivity are the important characteristics for photography originally [8]. In the course of recording medical science activities, the authenticity and objectivity are the essential characteristics of medical photography. Medical photography is an important information resource for medical image [9].

### Objective

The most important characteristic of medical photography is the objectivity, or the authenticity. Medical phenomenon is objective existing needs to be captured through method of documentary photography but without fabricating, embellishing or exaggerating. The records being taken pre-operative, during the operative procedures and post-operative must be objective and authentic, which could exhibit the overall features or localized details of the subject or part of the subject.

The author of this book has always insisted that, considering from the perspectives of the objective and authentic, medical photography should minimize the dependence on postproduction. The images which can not reflect the objective phenomena cannot be regarded as the evidence for medical demonstration or scientific research.

Even if the postproduction is allowed, the objectivity, authenticity and scientific nature of the image must be guaranteed. Meantime, attention should be paid to preserve the original image data in order to ensure the objectivity and authenticity of the image [9, 10].

### Opportunity Related

The timing of medical photography is directly influenced by time. Unlike general portrait or landscape photography that the photos could be taken again and again until the ideal photos are shot. In the whole course of treatment of a case, lots of treatment steps are likely to be transient and the most important step that needs to be recorded is a step once you miss it, there is no opportunity to reverse. Hence, the medical photography requires the photographers to have adequate mental preparation and excellent photography that be able to capture the image swiftly and accurately; so that the integrity and effectiveness of medical information could be ensured.

### Comparative

The images which taken by the medical photography can often be used as a comparative observation to evaluate the outcomes of the treatment, and help clinicians to accumulate the experience of diagnosis and treatment [11]. At the same time, medical images are helpful for case/research demonstration or the communication with the peers. Sometimes the photos taken in clinical work also have certain legal significance, in accordance with China's current medical malpractice burden of proof system, medical photography plays an important role in the preservation of evidence, for the clinical photos can be used as the concrete evidence in resolving medical disputes and dealing with medical accidents. Especially in the field of trauma and orthopedic surgery, maxillofacial plastic surgery, orthodontics and cosmetic surgery [12–14], image data can accurately record and prove the contrast before and after surgery, or provide evidence for evaluating the success rate, shaping or functional recovery [15, 16].

### Informative

The medical photography is the resource of medical information, which contains a lot of medical knowledge, carried by the images. With the use of digital cameras, medical image data has been widely spread. Medical imaging data can be combined with the computer, scanner, printer and other equipment to produce a more delicate and convincing image data. Moreover, the internet could reinforce the information capacity, realize the sharing of medical image information resources and lay a solid foundation for the spread of medical knowledge.

### Artistic

Medical photography not only needs to have and science related attributes, but also contains a certain function and role of aesthetic. Artistic reproduction of the subject of the status quo with enriched levels of various parts, well restored real color of the subject, clear exhibited features of the structures and proper performed texture would be a perfect combination of the science and art. So that the images which taken by medical photography can be more attractive and thus facilitate the spreading of its scientific characteristic.

The famous Chinese oral pathologist, Professor Li Tiejun from Peking University School of Stomatology, is a typical expert who could perfectly exhibit the characteristic of artistic in medical photography. Professor Li Tiejun is originally a photography enthusiast that good at scenery and portrait photography. He has perfect fused his hobby with his occupation. The pictures which taken under the microscope by him not only have the scientific attribute of objective and authentic, but also have the artistic form and connotation. These characteristics make his images amazing and impressive.

## The Start of Medical Photography in China

The medical photography in China has started since the 1930s in the last century, which the history is more than 80 years till today. After decades of development, especially in the past twenty years, medical photography in China has experienced the developing stages as the start of the medical photography, the perfection of the institutions, the promotion of the exchanges, theoretical innovation and creation and prosperity, which led medical photography developed very fast.

The founder of China's medical photography is recognized as the Mr. Jiang Hancheng from the Union Hospital. Mr. Jiang was a photographer, who had engaged in photography activities in China, and an expert of medical illustration. The Secretary General of the China Health Photography Association, Mr. Liu Yugang, has written an article in memory of Mr Jiang Hancheng and part of the article is extracted as below:

For photography, Mr. Jiang did not only treat it simply to satisfy the personal interests. He was also one of the early photographers who had engaged in photography creation, organized photography art group, held exhibitions and carried out photography activities. After the victory of Anti Japanese War, Mr. Jiang and other photographers formed the "Institute of photography in Peking". The photography did not only let Mr. Jiang sublimated in art, but also made him come into contact with many friends with similar ideals and goals. At that time, as the representative of photography, Mr. Jiang, the famous Chinese painter Mr. Jiang Zhaohe, and Erhu player Mr. Jiang Feng were called as "three masters whose family name were Jiang and lived in Yan Yuan". They had considerable influence in the fields of cultural and art.

Mr. Jiang Hancheng also has a deep foundation in painting. He had been hired by Mr. Xu Beihong as a visiting professor for the art of human body anatomy in Beijing National Art College.

Mr. Ye Qianyu had taken pictures for him, and he had also studied cartoons from Mr. Ye Qianyu. Mr. Jiang Hancheng's comic book had been published in the magazine at that time.

In 1933, Mr. Jiang Hancheng went to Beijing Union Medical College for medical graphics and medical photography, and created the medical photography and drawing room in that college. At the same time as the completion of the photographic task, he had also attended the anatomy, histology and other necessary courses in the medical school.

Mr. Jiang had a solid foundation in English, which facilitated his English reading and the acceptance of western culture and technology. In 1935, he was sent to John Hopkins University, department of the medical art to learn the courses as medical photography and medical graphics. He had also been to Kodak to learn infrared photography

and color photography. In 1936, he returned to China and became the director of the medical photography and drawing room.

In 1937, when there is no color photographic condition, Mr. Jiang used a method of dyeing and printing to wash color photos, which the color of preserved photographs is still bright and clear till today. During the 1950s of the last century, under the condition of absence of the color amplifier, he used black and white amplifier with filters to amplify color photos, and achieved ideal results. Mr. Jiang had also designed and manufactured the wooden horizontal micro camera device independently in the early time of the 1950s, which could take images clearly and explicitly and has been used till the 1980s.

From 1953 to 1957, under the support of the leaders from the Ministry of health and China Academy of Medical Science, Mr. Jiang has held three terms of medical photography training courses and several short-term classes. These classes have trained a large number of talented people of the medical photography for the medical schools and medical units all over the country.

## The Future of the Medical Photography

As an emerging science and a relative integrated technology, the role and function of the medical photography will become increasingly prominent in the fields of clinical treatment, medical teaching, scientific research and other aspects.

The medical photography has stepped into the era of digital photography from the era of daguerreotype swiftly. This is a great revolution. Just less than twenty years ago, people were still worried about the impact of digital photography technology on the traditional medical photography and debated whether digital techniques could be used in the field of medical photography. Nowadays, the digital technology has been quietly integrated into the field of medical photography and developed rapidly with the trend of replacing the traditional photography.

Digital photography has the advantages as high degree of automation, simple operation procedure, the image can be shown in a short time, simple image processing, integrated storage management, convenient transmission and low cost which brought tremendous impact on the traditional photographic technology and prompted the change of medical photography.

There is no doubt that the advanced objects would replace the backward objects, the simple things would take the place of the cumbersome things, and the new technology would alter the old technology [1, 17]. For these are the inevitable laws of social development, the medical photography will not be an exception. Therefore, medical photography is bound to enter the era of digital photography fully [13, 14, 18].

With the popularity of digital cameras, the medical photography has also been altered from the professional to the popular. About 10 years ago, many hospitals had a team specializing in medical photography. The clinicians would inform them when there were needs for taking photos or the clinicians would take the patients to their specific studio.

Now, many medical personnel have already picked up the camera and taken the photos of the patients for their needs, so that the medical photography has altered from the professional to the popular gradually. As a matter of fact, there have been many complex talents who are proficient in both clinical medicine and medical photography.

From a deeper level, with the increasing application of digital technology in the field of medicine, the total digitization of the medicine has become a general trend. On such basis, the digitalized medical photography has become an integral part of digital medical treatment, which can provide the basis for the establishment and development of digital medical model.

The Digital Smile Design, which is a very popular clinical technology in the field of oral medical aesthetics in the recent years, could complete the procedures as doctor-patient communication, doctor-technician communication, doctor-doctor communication and preliminary aesthetic design just on the basis of the data from Oral digital photography. And the developing and maturing 3D-DSD technology is the future development trend of digital dental aesthetic treatment, in which oral digital photography is a very important foundation.

## The Significance of Oral Clinical Photography

Capturing the image could save and use the information that can be missed, which is very important in clinical medical treatment. The oral clinical photography allows us to capture, to save more medical information, which is in favor for the communication between the doctors and patients, help us to carry out patient education. Besides, the Oral clinical photography could not only help us to improve the level of diagnosis [19] and treatment planning, but also facilitate the communication between the doctors or between the doctors and technicians. As part of the medical records, the images could also be used as a legal weapon to protect ourselves [20–25].

## Medical Records

Preserving the images for medical records is the most fundamental role of oral clinical photography, but also the initial motivation for many clinicians who wish to learn clinical photography. For clinical medical records which have medical significance, the records for complete pre-operative con-

dition, and treatment procedures during the operation and post-operative outcomes could form an ideal medical record that allow us to review and analyze the records, summary the experiences and lessons and improve the clinical treatment. The high quality medical images could also be used for teaching, publishing, demonstrating the working ability and achievements to more people and communicating between the colleagues [11, 20]. Nowadays, many doctors like to share their successful cases on the internet which requires good clinical photography as the foundation [26]. All of these could help them to improve the medical level on their specialties, and get more professional recognition [27].

[Actual clinical case] (Provided by Dr. Liu Feng)

Admission time: February 2008

The patient, Ms Liu, was a 22 years old female with medium or low smile line. She was suffered dental fluorosis and enamel hypoplasia for whole dentition, so that the enamel with low transparency could be seen in her mouth. Her upper and lower anterior teeth were slightly crowded and poorly arranged, and the gingival curve was uncoordinated. The maxillary right central incisor was tilted toward distal direction with obvious distortion. The midline of the upper dentition was shifted to the right side and oblique. The mandibular right central incisor was tilted toward labial direction. The occlusion of the posterior teeth was basically normal (Figs. 1 and 2).

The original suggestion for the treatment was to restore with the porcelain veneer after the orthodontic aligning. However, due to the patient had arranged going aboard for studying straight away, she declined the orthodontic treatment and requested to improve the esthetic outcome of her anterior teeth via the prosthodontic treatment. After the detailed communicating with the patient for the advantages, possible injuries and limitations for all the treatment plans, the patient still chose to use the porcelain veneer combined with full ceramic crown as the treatment protocol (Figs. 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, and 18).



**Fig. 1** The front view of the patient with smile before treatment





**Fig. 2** The front view of the anterior teeth before treatment



**Fig. 5** Tooth preparation



**Fig. 3** Model design



**Fig. 6** Tooth preparation



**Fig. 4** Silicone matrix



**Fig. 7** Work model

Before mastering the techniques of the clinical photography, many clinicians have the similar experiences as: when we have finished a perfect clinical case, just because of the pre-operative photographic data and Intra-operative imaging data were found as unavailable, the scientific and effectiveness of

clinical data were greatly reduced. And sometimes, we may found that that the image data is not complete when we want to giving a lecture, teaching a lesson or publishing a book. Or even we could find ideal or complete image data that could meet the requirements of the journals or the conferences when we want to submit our work to the scientific journals or to get the qualification for the conferences or symposiums. At all these moments, many doctors would totally realize the necessity and importance of clinical oral photography.