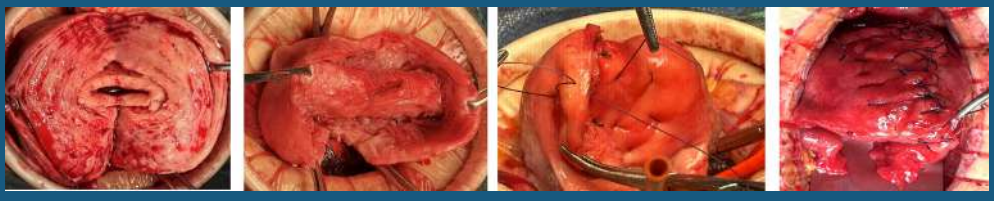
Current Natural Sciences

ADENOMYOSIS & HUMAN FERTILITY

Ruifang WU, Liping ZENG, and Xinfeng QU
(Editors-in-Chief)

PUSH Approach

Innovations on Fertility-Reconstructive Surgical Procedures for Diffuse Uterine Pathologies



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This book introduces a novel surgery for treating diffuse adenomyosis (DAD) and diffuse uterine leiomyomatosis (DUL), two conditions commonly encountered in women of reproductive age. Both diseases share similar symptoms, including dysmenorrhea, menorrhagia, uterine enlargement, and infertility. For severe cases of DAD and DUL, surgical approaches are often the only option to preserve or restore a patient's fertility, though it presents significant challenges. The PUSH (Process for Uterine Structural Healing) Approach, a novel approach developed by a team led by **Dr. Ruifang Wu** and **Dr. Liping Zeng** from Peking University Shenzhen Hospital (PUSH), provides a surgical solution for patients with DAD and DUL. The data of over 500 DAD and 60 DUL patients who underwent the PUSH Approach and the pregnancy outcome from some of them demonstrate that it is highly effective in achieving radical excision of DAD/DUL lesions, resulting in symptom relief and satisfactory preservation of the functional uterine anatomy for fertility. This book explains the rationale and mechanism, detailed procedures, and perioperative management of the PUSH Approach, with particular focus on its features, which form the basis for lesion type- and location-specific surgical protocols.

This book not only provides significant referral information about PUSH Approach to professionals but also conveys key messages on uterine health and fertility preservation to all readers.

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About the Editors-in-Chief

Ruifang Wu



Dr. Ruifang Wu is currently a Professor at Peking University in Obstetrics & Gynecology and serves as the Chair of the Obstetrics & Gynecology Institute at Peking University Shenzhen Hospital (PUSH). With over 40 years of medical practice, she devoted 21 years as the Director of the Department of Obstetrics & Gynecology at PUSH. As the principal investigator, she has designed and led numerous clinical trials, including five international collaborative cross-sectional research projects and multiple multi-center clinical trials. Her research covers a wide range of areas, including cervical cancer prevention, cervical precancer treatment, female fertility preservation, and the development of innovative surgical procedures. Dr. Wu has gained international recognition for her contributions in validating new technology for cervical cancer screening, creating new models for screening, developing and validating protocols for triaging primary HPV positives, popularizing innovative treatment technologies for cervical precancers, and advancing in-facility

preservative surgery for diffuse adenomyosis. She has published over 300 papers in journals.

Some notable research projects led by Dr. Wu as Principal Investigator include the China Multiple Center Cervical Cancer Screening Trial (CHIMUST). Additionally, she served as Co-Principal Investigator on significant collaborative trials in China, such as the Shenzhen Cervical Cancer Screening Trial II and III (SHENCCAST II & III), China Cervical Cancer Screening Study (CHICAPS), and the National Institutes of Health/National Cancer Institute (NIH/NCI) awarded clinic trial, "Comparison of cervical intraepithelial neoplasia 2/3 treatment outcomes with a portable LMIC-adapted thermal ablation device *vs.* gas-based Cryotherapy".

Dr. Wu's recognition is further evidenced by her public service roles, including Chairperson of the Chinese Society for Fertility Preservation of the Chinese Preventive Medicine Association (CSFP); Vice Chairperson of the Obstetrics & Gynecology Committee of the Female Physician Committee of China; Member of the Reproductive Endocrinology Specialists Committee of the Obstetrics & Gynecology Subsidiary of the Chinese Medical Association; Executive Member of the Chinese Society of Colposcopy and Cervical Pathology (CSCCP); Member of the Council for the Committee of Shenzhen of the Chinese Medical Association; and Guest Editor for various journals, including the Chinese Journal of Obstetrics and Gynecology, Journal of International Obstetrics and Gynecology, Gynecology and Obstetrics Clinical Medicine (GOCM), and the Chinese Journal of Clinical Obstetrics and Gynecology.

Liping Zeng



Prof. Liping Zeng is the Chief Physician and Director of the Reproductive Surgery Department at the Obstetrics & Gynecology Center of Peking University Shenzhen Hospital. She has worked in gynecological education and clinical practice for

35 years, specializing in gynecological reproductive surgeries, the diagnostics and therapeutics of gynecological endocrine diseases, and minimally invasive surgeries for fertility preservation.

Over the past 15 years, Dr. Liping Zeng, as the co-principal investigator of the reproductive surgery team, played a core role in the development and optimization of the PUSH Approach. Meanwhile, she has dedicated herself to research in fertility preservation therapeutics with remarkable achievements evidenced by more than 38 scientific publications, 12 SCI collected publications, 10 national and provincial research funds, and authorship in two academic books.

She also holds positions as a Member of the Standing Committee and Secretary-General of Fertility Preservation of the Chinese Preventive Medicine Association (CSFP), Deputy Director of the Family Planning Division of the Shenzhen Medical Society, Deputy Leader of the Female Fertility Protection Group of the Maternal and Child Health Industry Branch of the National Health Industry Enterprise Management Association, and a member of the first council of the Obstetricians and Gynecologists Branch of the Shenzhen Medical Doctor Association, among others.

Xinfeng Qu



Xinfeng Qu, MD, is a core fellow of the "Sanming Project" at Peking University Shenzhen Hospital. He previously served as a senior researcher at Preventive Oncology International (POI) and Basic Health International (BHI). Dr. Qu has decades of experience in clinical research, specializing in research project design, implementation, and evaluation, particularly in program quality assurance mechanisms. As a key member of research teams, he has served as Site Coordinator in several internationally collaborative investigator-initiated clinical trials, including "Shenzhen Cervical Cancer Screening Trial II" (SHENCAST II), "China Cervical Cancer Prevention Study" (CHICAPS), and "China Multi-center Cervical Cancer

Screening Trial" (CHIMUST). He was also the China coordinator for two NIH/NCI-funded international multi-center clinical trials: "A randomized controlled trial comparing cure rates of cervical intraepithelial neoplasia grade 2 and higher (CIN2+) treated with CO2-based cryotherapy, CryoPen®, and thermoablation" (HU3 funds) and "Comparison of cervical intraepithelial neoplasia or higher 2/3 (CIN2+) treatment outcomes with a portable LMIC-adapted thermal ablation device *vs.* gas-based cryotherapy" (jointly funded by NIH/NCI RO1 and Gateway funds). Additionally, he is the core investigator of a study titled "Self-Collected Cervical Cancer Prevention Study" (SCOCCAPS), which focuses on evaluating an internet-facilitated community model and online approach for self-collected cervical cancer screening, as well as assessing positive triage algorithms specifically for self-collected screening.

In recent years, he has been listed as a main author or a corresponding author on more than 20 publications. He served as the Deputy Editor-in-Chief, the Deputy Translator-in-Chief, and one of the core translators of published academic monographs: "PUSH Surgery-A Fertility-Preservative Surgery for Diffuse Adenomyosis With Process for Uterine Structure Healing," "Benign Diseases in Female Lower Reproductive Tract," and "Gynecological Oncology", respectively.

Contributors

Editors-In-Chief

Ruifang WU
Liping ZENG
Xinfeng QU

Deputy Editors

Changzhong LI, Peking University Shenzhen Hospital
Yan LIU, Fudan University Huashan Hospital
Hui DU, Peking University Shenzhen Hospital
Qicai HU, Peking University Shenzhen Hospital
Wei ZHANG, Peking University Shenzhen Hospital

Editors *(in alphabetical order by surname)*:

Wenkui DAI
Hui DU
Chunlei GUO
Qicai HU
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Yan LIU
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Xinfeng QU
Xiuli SUN
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Nan WANG
Weixia WEI
Ruifang WU
Yingjuan YU
Dachuan ZHANG
Wei ZHANG
Liping ZENG
Yucui ZENG

Foreword

We are thrilled to discover that a team led by Professor Ruifang Wu and Professor Liping Zeng has proposed a fertility-preserving surgeical procedure for diffuse uterine pathologies, which was developed by modifying the well-recognized "Triple-Flap" procedure with some technical and procedural innovations that are composed to be a **p**rocess for **u**terine **s**tructural **h**ealing (PUSH), which made the modified procedures distinguishable from it origin, and is known as the PUSH Approach. To develop and optimize the PUSH Approach, they have dedicated over 15 years to research and clinical exploration. Drawing from a comprehensive understanding of the histological and physical characteristics of uterine anatomies, they designed and developed inventive surgical procedures and techniques to facilitate the radical removal of diffuse uterine lesions while ensuring the protection of functional uterine anatomies.

Diffuse Uterine Pathologies (DUP) commonly occur among women of childbearing age and cause infertility and intolerable pain that significantly impacts the quality of life of these patients. DUP mainly refers to diffuse adenomyosis (DAD) and diffuse uterine leiomyomatosis (DUL), which are histologically characterized by the diffuse invasion of ectopic endometrial tissues into the myometrium and the dense distribution of numerous myomas within the myometrium, respectively. Drug therapy for DAD usually does not provide sustainable relief from intolerable symptoms. Most patients with severe DAD have to undergo a hysterectomy, resulting in the loss of fertility. Although surgical approaches enable the excision of myomas in DUL patients without the need for hysterectomy, conventional methods are often associated with incomplete removal of lesions, a high rate of recurrence, and subsequent infertility.

To treat DAD and in referring to the "triple-flaps" procedure, the team developed multiple skills for lesion excision, optimized the surgical procedures for uterine reconstruction, and introduced innovative techniques such as vertically penetrative mattress sutures (VEPMAS) and muscle flap wrinkling overlapping (MUFWRO). These skills and technologies work well to protect the cervical mucosa, minimize injury to the endometrium, and preserve the functional uterine anatomy while radically excising the DAD lesions, enabling the surgeons to achieve sufficient thickness and pressure tolerance for the reconstructed uterus. PUSH Approach is a

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surgical approach that can alleviate patients' symptoms and sustainably and effectively restore their fertility.

To treat DUL, the team employs innovative skills and technology in surgical procedures to address the challenges of radical excision of DUL lesions and reconstruction of the uterus. They excise numerous myomas radically and reconstruct the uterus with MUFWRO to protect and restore uterine anatomy for fertility. They achieved satisfactory outcomes regarding the elimination of patients' intolerable symptoms and restoration of fertility.

Undoubtedly, the innovations in the PUSH Approach offer a novel approach for DUP treatment aimed at preserving patients' fertility. More than 500 DAD patients and 60 DUL patients from 25 provinces nationwide have accepted the PUSH Approach. Data from follow-ups on those patients show very satisfactory therapeutic outcomes. The PUSH Approach is now adopted by several hospitals in Mainland China. The team is maintaining and will continue follow-ups with all the patients who have undergone and will undergo the PUSH Approach, in order to collect more data for evaluating the long-term outcomes of the PUSH Approach.

This book provides readers with exhaustive descriptions of the indications, contraindications, essential surgical procedures, lesion excision, and uterine reconstruction techniques and skills, optional solutions for various lesion conditions, perioperative patient management, and postoperative pregnancy instructions, all of which are highly instructive and practical for gynecological clinical practice. It is a valuable reference book for gynecologists and physicians in relevant areas.

For all of the above, I write this foreword for the book.

Lihui Wei
Professor of Peking University People's Hospital
Honorary Director of the Obstetrics & Gynecology System of Peking University
Chairperson of the Chinese Society of Colposcopy and Cervical Pathology (CSCCP)

Preface

In this book, we try to provide readers with exhaustive descriptions of an innovative surgical approach for diffuse adenomyosis (DAD) and diffuse uterine leiomyomatosis (DUL), two diseases that commonly occur in women of childbearing age. These conditions share symptomatic problems such as dysmenorrhea, menorrhagia, anemia, uterine enlargement, and infertility, and they have significant negative impacts on patients' fertility and quality of life.

Conventionally, until now, surgical treatment has been the only approach for patients suffering from severe DAD/DUL who hope to preserve their fertility. These diffuse uterine pathologies have long been recognized as "impossible for complete cure", as conventional surgical methods often fail to eliminate the lesions and prevent recurrence. Many patients have had to painfully accept a hysterectomy, resulting in the loss of their fertility, even when some were eager to have a baby.

The challenge of radically excising the DUP lesion for symptom improvement while adequately protecting the uterus for fertility recovery has generated significant demand within the medical community for more effective approaches. With over more than 15 years of diligent exploration, experimentation, and optimization, our team — the reproductive surgical team from the Gynecology Center of Peking University Shenzhen Hospital (PUSH) — has developed a fertility-preserving surgical procedure for DUP through modifying the "Triple-Flap" procedure with technical and procedural innovations tending to achieve both long-term symptom relief and safe pregnancy. We gave the modified surgical procedure a name: "Fertility-reconstructive approach for diffuse uterine pathologies with a **p**rocess for **u**terine **s**tructural **h**ealing" or PUSH Approach, to distinguish it from its origin and to address its effectiveness in facilitating the radical excision of DUP lesions while properly protecting the uterine anatomy. Data from follow-ups with more than 500 DAD patients and over 60 DUL patients who underwent the PUSH Approach demonstrate satisfactory outcomes in terms of sustainable symptomatic relief and fertility restoration. The success of the PUSH Approach is altering the conventional understanding of DUP treatment. With the PUSH Approach, we have opened a door for patients suffering from DUP who strongly desire to preserve their fertility.

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In this book, we aim to introduce the PUSH Approach, focusing on its rationales and mechanisms, detailed surgical techniques, perioperative patient management, and case analyses. The introduction of the PUSH Approach in this book also includes alternative solutions for the challenging conditions we may encounter in the treatment of DUP patients.

Written on each page of the book are the concerns of the team for our patients, the commitment of the team to medical innovations, and the aspirations of the patients for new lives. With the publication of this book, I express my deep thanks and sincere gratitude to all team members for their unwavering efforts and outstanding contributions to the development of the PUSH Approach, to all the patients who underwent the PUSH Approach for their trust in us and their high level of cooperation, to all the medical colleagues for their encouragement and recognition of our work, to the editors for their hard work in making this book published, and, especially, to Professor Lihui Wei for her foreword for this book.

Ruifang Wu, MD
Liping Zeng, MD
Xinfeng Qu, MD

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