
Regenerative Medicine in Pain Practice

Ripu D. Arora
Editor

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 Springer

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*Dedicated to my dearest wife Sheila, my
parents, my family, my mentors, my patients,
and my teachers.*

Foreword

Regenerative Medicine in Pain Practice by Ripu D. Arora, MD, offers a comprehensive knowledge-based handbook presented in a manner that leaves the reader eager to learn more. While many books address regenerative medicine, this volume is among the rare few that focus specifically on its role in pain practice. The presentation is clear, the writing is easy to follow, and the content provides practical insights and answers to questions commonly raised by clinicians. With its 12 chapters, numerous figures, and extensive reading list, the book serves as both a guide and a resource.

In the second edition of *Essentials of Regenerative Medicine in Interventional Pain Management*, Manchikanti et al. described regenerative medicine as an “emerging specialty.” Dr. Arora and his coauthors advance this concept further, arguing that the field has moved beyond its emerging stage and has reached a level of maturity. Regenerative medicine spans a broad spectrum of scientific disciplines, including engineering, molecular sciences, biologics, and healthcare-related research, all of which are addressed in this work.

What sets regenerative medicine apart is its focus on repairing, replacing, or restoring damaged or diseased tissues and organs, in contrast to most medical and surgical interventions that primarily manage symptoms. As detailed in this book, regenerative therapies encompass a wide variety of techniques, including stem cell therapy, platelet-rich plasma (PRP) and its derivatives, tissue engineering, and gene therapy. These modalities are clearly explained and thoughtfully applied to both spinal and non-spinal disorders, including neurodegenerative diseases.

As this book illustrates, regenerative medicine is a rapidly advancing field with active global research and development. Scientists continue to refine the safety and effectiveness of these therapies while exploring new applications. Yet, important challenges remain—ethical considerations, potential unintended consequences, and questions of accessibility and affordability, particularly within the United States.

In conclusion, regenerative medicine offers tremendous promise for patients suffering from pain, with the potential to transform treatment by addressing underlying pathology rather than simply managing symptoms. However, it is essential to recognize that these therapies are still evolving, may not be suitable for every patient, and may not be widely affordable at present.

Dr. Arora is to be commended for his valuable contribution to the field. His clear writing style, practical approach, and use of illustrative figures make this book an important addition to the literature and a useful resource for clinicians and trainees alike.

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Foreword

In the past two decades, orthobiologics have transitioned from being experimental adjuncts in musculoskeletal care to becoming one of the most promising pillars of regenerative medicine. For conditions of the spine, joints, and soft tissues—often defined by chronic pain, functional decline, and limited natural healing capacity—orthobiologics offer the possibility of restoring form and function by working with the body’s own repair mechanisms.

This book was conceived to bridge a critical gap: the need for a comprehensive, clinically focused resource that integrates the latest scientific evidence with practical insights for the practicing spine, orthopedic, sports medicine, and rehabilitation specialist. While high-quality research in orthobiologics is rapidly emerging, the pace of discovery has often outstripped the availability of organized, clinically digestible guidance. Too often, clinicians must navigate fragmented literature, varying procedural techniques, and evolving regulatory frameworks without a clear roadmap.

The scope of this text extends beyond a simple catalog of biologic agents. It is designed to offer a deep understanding of the biology, rationale, and clinical applications of the most relevant orthobiologics interventions—including platelet-rich plasma (PRP), bone marrow aspirate concentrate (BMAC), adipose-derived cell preparations, extracellular vesicles, and acellular scaffolds. Each chapter aims to blend foundational science with real-world procedural considerations, patient selection strategies, and outcome interpretation. The emphasis on spine, orthopedic, and musculoskeletal tissues reflects both the highest areas of clinical demand and some of the most exciting arenas of innovation. The spine, with its unique structural and vascular challenges, has been at the forefront of both enthusiasm and controversy regarding regenerative solutions. Similarly, degenerative joint disease and chronic tendinopathies remain prevalent causes of disability worldwide, where orthobiologics may shift the paradigm from symptom suppression to biologically driven repair.

This book is also grounded in the principle that orthobiologics cannot be practiced in isolation from the broader context of musculoskeletal medicine. Optimal patient outcomes depend on integrating biologic interventions with mechanical correction, physical rehabilitation, metabolic optimization, and patient education. To that end, each section emphasizes multidisciplinary collaboration and the importance of tailoring therapies to the individual rather than applying one-size-fits-all protocols.

The chapters draw on the collective expertise of clinicians, scientists, and researchers who have been instrumental in advancing the field. Their contributions span randomized controlled trials, registry analyses, translational research, and long-term follow-up studies that inform both safety and efficacy. We also address the regulatory, ethical, and economic considerations that every practitioner must navigate when offering orthobiologics care—because clinical excellence must be matched with compliance and patient trust.

As we stand at the intersection of biology, engineering, and clinical medicine, orthobiologics represent more than a new treatment category; they embody a new way of thinking about tissue repair and functional restoration. This book, being grounded in practicality, equips the physician not only with knowledge, but also with the discernment to apply these tools responsibly, effectively, and innovatively at the point of care.

The journey of orthobiologics is still unfolding. This book invites you to be an active participant in shaping its future—for the benefit of our patients, our profession, and the science of healing itself.

Annu Navani, MD, FIPP, ABIPP, DABRM

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Annu Navani

My Regenerative Stem Cell Therapy with Dr. Ripu Arora

A Patient Perspective and Testimonial

Finding Hope After Years of Pain

For years, chronic knee pain controlled my life. Simple activities like climbing stairs, playing my favorite sport, paddle tennis, even short walks, had become increasingly difficult. After exhausting conventional treatments including physical therapy, anti-inflammatories, and cortisone injections with only temporary relief, I faced knee replacement surgery. That's when I discovered regenerative stem cell therapy and Dr. Ripu Arora.

Exceptional Care from a Master Physician

Dr. Arora's over three decades of experience in regenerative medicine and interventional pain management was immediately apparent. What set him apart was his ability to explain the complex science in understandable terms while maintaining realistic expectations. His philosophy resonated deeply: "Our goal is to help the patient as a whole, to improve the quality of life and improve their functionality in life."

He didn't oversell the treatment. Instead, he educated me honestly about how regenerative medicine works and carefully assessed whether I was a suitable candidate. His integrity and patient-centered approach gave me complete confidence.

Masterful Execution

The administration procedure showcased Dr. Arora's artful precision. His decades of experience in anesthesiology were evident in every aspect. What could have been intimidating felt seamless and professional. He remained fully present, explaining each step while demonstrating remarkable mastery of this developing science.

The hour-long procedure involved minimal discomfort, testament to his exceptional technical skill. I walked out the same day with comprehensive post-procedure instructions.

Life-Changing Results

Within four to six weeks, the constant aching that had plagued me for years began diminishing. By three months, my progress was remarkable.

Six months later, my life has been transformed. I walk without pain, hike on weekends, and keep up with my grandchildren. The stiffness and inflammation have dramatically decreased, restoring mobility I thought was lost forever.

My Highest Recommendation

Dr. Arora's belief that "regenerative medicine is going to be the art of medicine, which everybody will be utilizing in the years to come" proved prophetic. His forward-thinking approach, ethical practice, strict adherence to compliance, and dedication to patient education made all the difference in my journey.

If you're dealing with chronic knee pain and conventional treatments have failed, I cannot recommend Dr. Ripu Arora highly enough. His mastery of interventional pain management, pioneering work in regenerative medicine, and compassionate guidance provide the ideal combination for relief. He doesn't just treat pain; he partners with patients to restore their quality of life through cutting-edge medical science.

This treatment gave me back my independence and the ability to enjoy life again. For that, and for Dr. Arora's exceptional care, I'm truly thankful.

Cengiz Volkan

A grateful patient

Preface

My Journey into Regenerative Medicine

I am a board-certified pain management anesthesiologist with over three decades of experience in treating chronic pain. Recently, I added a certification of Competency in Regenerative medicine through the American Society of Interventional Pain Physicians (ASIPP), marking a formal milestone in my journey. My motivation is driven by personal experience, professional curiosity, and a commitment to offering better healing options to my patients to improve the quality of their lives.

A decade ago, I experienced two major injuries, including a lateral meniscus tear of my right knee and a massive rotator cuff injury in my right shoulder. The latter was deemed inoperable by orthopedic surgeons, leaving me searching for alternatives.

In the process, I discovered the emerging field of regenerative medicine. I underwent regenerative mesenchymal stem cell therapy on both the affected knee and the shoulder. The results were nothing short of transformative. Within 9–12 months, I regained full functionality, returning to the activities I love, such as golfing, skiing, and traveling.

Impressed with my own recovery, I immersed myself in studying and learning more about regenerative medicine. I attended conferences, read emerging literature, and engaged with experts in the field. As I gained confidence and knowledge, I began offering regenerative treatments in my clinical practice of interventional pain management. The outcomes have been very encouraging as many patients have reported substantial improvements with reduced pain, increased functionality, and improved quality of life.

Over the years, I've received countless questions from patients and colleagues alike about the science, the procedures, the evidence, and the potential benefits of regenerative therapies. These conversations inspired me to write this book.

I also decided to use the title “Regenerative Medicine in Pain Practice” because I strongly believe that every pain management physician should understand the immense value that regenerative medicine offers to our practice. It is an important tool and resource to help address the complexity of chronic pain in ways that traditional therapies often cannot.

This guide is created for pain specialists, physicians, residents, and informed patients seeking to understand and apply regenerative medicine in real-world

clinical scenarios. It blends evidence-based science with clinical experiences to demystify regenerative medicine and its potential to help in pain management. This book explores how regenerative medicine is reshaping pain practice by focusing on tissue repair and functional restoration rather than mere symptom suppression. Regenerative medicine is not a replacement, but a vital addition to the existing algorithm of pain management options.

I am deeply grateful to my mentors and colleagues who have influenced this journey, including Dr. Laxmaiah Manchikanti, Dr. Annu Navani, Dr. Sudhir Diwan, Dr. Sheldon Jordan, Dr. Devi Nampiarampil, Dr. Joseph Cabaret, and Dr. Sheri Albers.

My deepest appreciation goes to my wife, Sheila Arora, my partner in life and working physician assistant in my practice, whose support has been unwavering. I thank my friends, families, and children for their encouragement, and my beloved parents, whose values and sacrifices gave me the foundation to serve others.

Thank you for joining me on this journey toward better healing and innovative care.

Torrance, CA, USA

Ripu D. Arora

Disclosure

All figures were prepared by the author as original schematic illustrations using Microsoft PowerPoint for this volume. The images are author-created, copyright-free, and designed solely for educational purposes, without the use of AI tools or stock imagery.

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Editors and Contributors

About the Editor



Ripu D. Arora, MD, MBA is a board-certified pain management anesthesiologist with Competency certification in Regenerative Medicine by American Society of Interventional Pain Physicians (ASIPP). He has been practicing in Torrance, California, at the Arora Pain Clinic for the past three decades and has an outstanding reputation. He provides passionate care to his patients.

He is a longtime resident of the South Bay area. For over 30 years, he and his wife Sheila Arora, PA-C, have raised their two children there and now enjoy time with their grandchildren.

He specializes in interventional pain management and regenerative medicine. He is known for his keen ability to identify pain triggering mechanisms and for his ability to personalize targeted treatments for optimal patient outcomes. His treatment plans integrate a multidisciplinary approach. He treats his patients based on their own unique physical, psychological, and social needs. His techniques vary from simple nerve injections to advanced interventional pain procedures. He employs regenerative therapy for carefully selected patients.

He earned his medical degree in India, completed orthopedic and surgical training in the UK, and pursued additional training in the United States, including a residency in anesthesiology at Case Western Reserve University, Ohio. He later earned an MBA in Healthcare from the University of California, Irvine, graduating with honors (Beta Gamma Sigma).

He is affiliated with Providence and Torrance Memorial hospitals and has served as Chief of

Anesthesia and Pain Management at Pacifica Community Hospital. He is a member of the Board of Directors for the California Society of Interventional Pain Physicians (CALSIPP) and is a life member of the American Society of Interventional Pain Physicians (ASIPP). He has been Past President of CALSIPP and Past President of his alumni association where he organized educational programs and annual meetings. He is a philanthropist. Currently, he is involved with nonprofit organizations whose goals are to end homelessness in Southern California.

When he is not in the clinic, he enjoys skiing, golfing, scuba diving, flying, photography, and traveling with his family and friends.

Sheldon Jordan, MD is a Fellow in the American Academy of Neurology and is board certified in Neurology, Clinical Neurophysiology, Addiction Medicine, and Interventional Pain Management. He is recognized as a top neurologist by Best Doctors in America, Who's Who, Global Edition, and Super Doctors. He trained at both Johns Hopkins and UCLA (University of California at Los Angeles). He has recently retired after 40 years of service at UCLA and the University of Southern California. He is the CEO of The Regenesys Project, Synaptec Network, and Synaptec Research, which are actively involved with cutting-edge research in advanced imaging, focused energy treatments, and regenerative medicine. His work also includes animal and human research on exosomes and stem cells. He and his team work in collaboration with other innovators on research focused on gene therapy using plasmid and viral vectors. He is one of the working visionaries in the development of the GARM clinics whose mission is to provide a range of regenerative treatments to improve the length and quality of life, tailored to a patient's individual needs. He has several clinics in the United States with increasing numbers of clinics scattered throughout the world. He has written over 200 publications and lectures both nationally and internationally. He has been honored with two nominations for

the XPRIZE, which is an organization that launches prize-driven global competition, choosing innovators from across the world whose transformational ideas can be tested and will ultimately produce working solutions to global problems. His main areas of interest are in resetting the biological central clock of aging and reversing neurodegenerative diseases.

Joseph Cabaret is triple board certified in Anesthesiology, Interventional Pain Management, and in Addiction Medicine. He is the founder and CEO of Genesis Pain Specialists in Camarillo and Anaheim, CA. He is Past President and the current Director of the California Society of Interventional Pain Physicians. He is an instructor in interventional and regenerative medicine techniques for the American Society of Interventional Pain Physicians. He is also a board examiner for the American Board of Interventional Pain Physicians. He has been practicing regenerative medicine since 2012. He has given multiple national lectures and has written several book chapters on regenerative medicine principles and techniques.

Sheri L. Albers is a DO, Fellow of the American Society of Interventional Pain Physicians (FASIPP), Fellow of the American Osteopathic College of Radiology (FAOCR), Competency Certification in Regenerative Medicine (ABIPP). She is trained in Radiology (Medical Center of Delaware), Fellowships: Cross-sectional Imaging (MSK/Body, Medical Center of Delaware), Neuroradiology (University of California-Davis), Interventional Pain Medicine (University of California-San Diego). Currently she is Director of Clinical Services and Research for Radiology Research and Consultation. She is board certified in ABIPP, ABR, AOBR. Her Honors and awards include Past President: ASIPP (2022–2023), Board of Directors: ASIPP, Editorial Board and Radiology Section Chief for Pain Physician, AMA CPT Advisory Committee Alternate, Board Examiner: ABIPP, Board of Directors: CALSIPP, Board of Directors: IMCAT.

She has also received Life time achievement award ASIPP, Manchikanti Excellence Award: ASIPP, League of Presidents Award: ASIPP, Distinguished Service Award: ASIPP, Outstanding Achievement Award: ASIPP, Trener Award for Outstanding Didactic Service for the AOACR, Board of Directors: AOACR, Visiting Professor: Michigan State, Internal Medicine Award for Clinical Excellence, Delta Omega Award, Dean's Commendation, Founding Chairperson and President of the Resident's Section: Philadelphia Roentgen Ray Society, Psi Chi, Phi Beta Kappa, Phi Kappa Phi

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