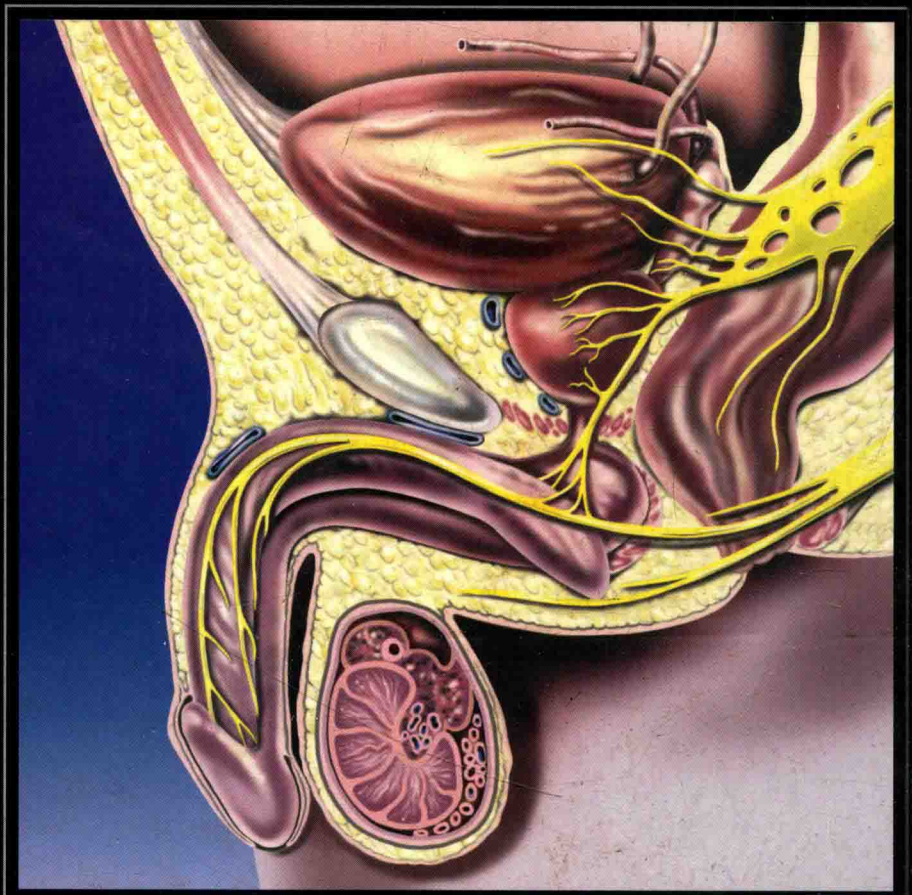


Textbook of Erectile Dysfunction

Edited by
Culley Carson
Roger Kirby
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Textbook of Erectile Dysfunction

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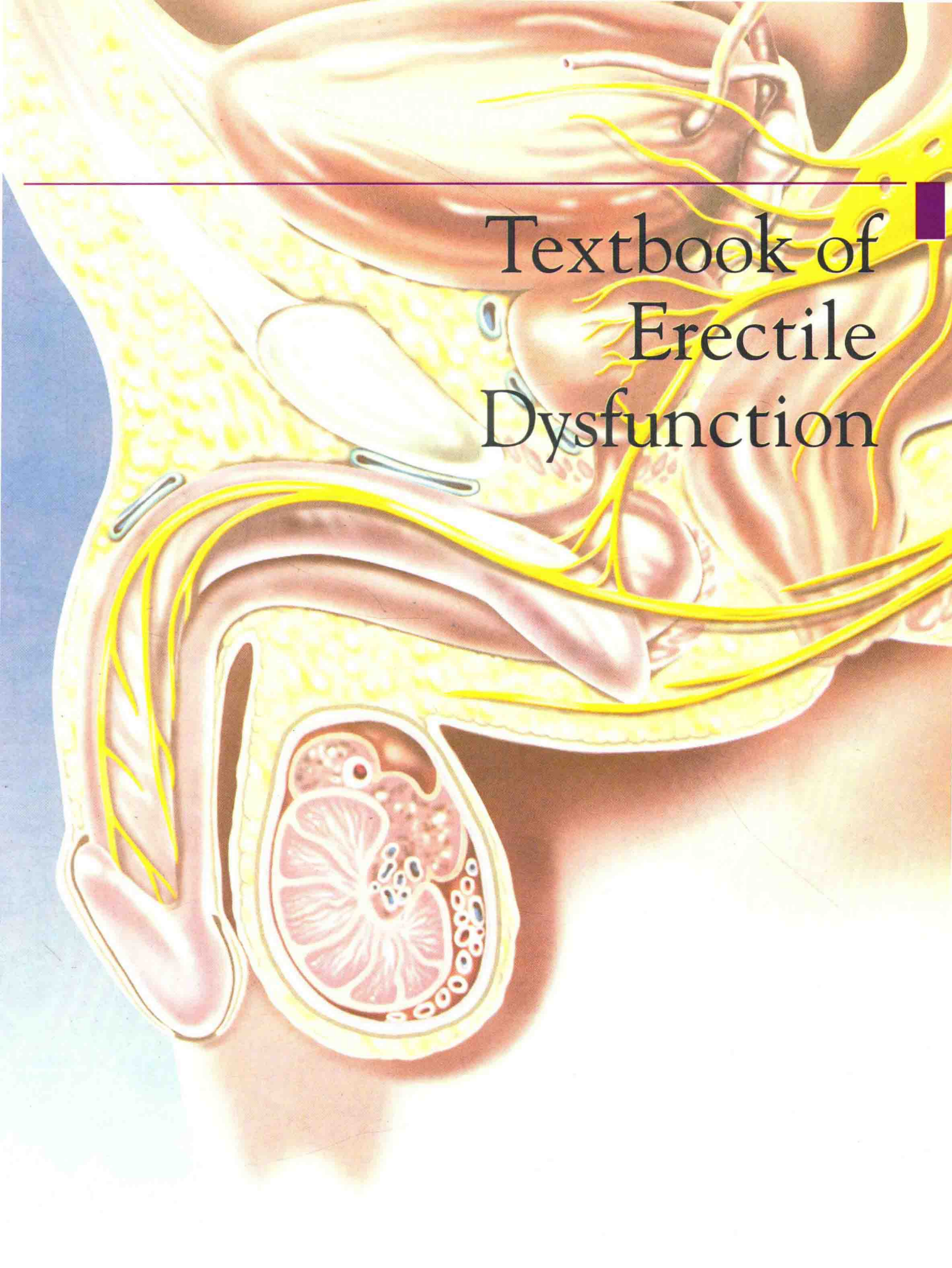
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Forewords

Erectile dysfunction affects many millions of men around the world. I suppose that I have been asked to write a foreword for this important book because I have worked all my scientific life on chemical mediators, with a special reference to the circulation. Those mediators that are usually released by the autonomic nervous system, such as acetylcholine and noradrenaline, have long been manipulated by preventing their release, or their activity, or by increasing their effects through inhibition of their breakdown.

In recent years, we have learned that the endothelial cell also exerts a highly important influence over the circulation through the release of mediators such as prostaglandins, nitric oxide (NO) and endothelin-1 (ET-1). Just as important was the subsequent discovery that non-adrenergic, non-cholinergic (NANC) transmission is largely mediated by NO. NANC NO is synthesized by parasympathetic neurons present in cavernous nerves and acts directly on guanylate cyclase in the vascular smooth muscle fibres. Other pro-erectile mediators, such as acetylcholine, calcitonin gene-related peptide or substance P, act by promoting the synthesis of NO in endothelial cells. Even the endothelial vasoconstrictor endothelin-1 has been implicated, working through ET-B-receptor stimulation and endothelial NO release.

The relevance of these chemical mediators to erectile dysfunction is thoroughly explored in this volume. Erection depends on vasodilatation and, as new endogenous vasodilators have been discovered, so they have been explored in erectile dysfunction. Intracavernosal injection of prostaglandin E1 is one of the more successful treatments, but the discovery, in 1986, that endothelium-derived relaxing factor is NO dramatically shifted the focus of attention towards this simple gaseous mediator. The fact that NO is also released by the nitro-vasodilators explains nicely the 'street' reputation of amyl nitrate as an aphrodisiac.

To overcome inadequate NO release, several pharmacological strategies are available. Replacement therapy, either locally or systemically with an NO donor, is possible. At the forefront is the insertion of a pessary into the urethra. NO relaxes smooth muscle by activating guanylate cyclase, leading to the formation of cyclic guanosine monophosphate (cGMP). Inhibition of the phosphodiesterase (PDE) enzyme specific for cGMP (PDE5) is another promising approach, especially as inhibitors are available for oral administration. Chapter 26 describes the clinical efficacy and safety of an orally available PDE5 inhibitor, sildenafil, which is now being marketed highly successfully around the world.

The textbook as a whole is comprehensive; each chapter is written by experts in the field. The basic science covers the history, epidemiology, anatomy and physiology, with good chapters on the chemical mediators involved. Clinical methods of evaluation include psychological and physical assessments. The promise of orally available or non-inductible techniques is fully covered, as is the use of surgery and surgically implanted prostheses.

This volume is most timely in that the problem of erectile dysfunction is clearly now more and more susceptible to pharmacological solutions. I commend it to the reader.

Sir John Vane
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Our understanding of erectile physiology has progressed rapidly in recent years, with the determination of the mechanisms involved at both cellular and molecular levels. Research has also unravelled the complex microscopic anatomy of the penis and has elucidated how messages are relayed between cells to bring about erection. This wealth of information has had important consequences for the many millions of men with impotence, or erectile dysfunction (ED), as it is more commonly known today. Clinicians can now understand the complex process of erectile dysfunction and appreciate that the patient's problems may be due not only to organic causes but also to psychological elements. Added to this knowledge is a vast array of treatment options that are available to the patient. We have even progressed to the point where a pill can potentially be used to overcome ED.

This book provides a comprehensive overview of all aspects of ED and includes contributions from a broad array of experts in the field. The initial section focuses on the history of ED, how widespread the condition is and the risk factors involved in its occurrence. Erectile physiology is reviewed at the vascular, neurological and endocrinological levels. Accurate diagnosis is essential and the progressive stages involved in this process are detailed. Initially, a patient history and sexual inventory is taken, followed by a physical examination and routine laboratory tests; psychological assessment may also be carried out at this stage. On the basis of these results, a number of tests may be appropriate, including nocturnal penile tumescence testing, Doppler imaging and pharmacavernosometry/cavernosography. Therapeutic options based on the diagnosis are reviewed in depth and range from simple vacuum devices to inflatable penile prostheses. Medical therapy may be administered via a number of routes, including cavernosal injection, urethral deposition and orally. Importantly, the complications that may be associated with the particular therapies are included. Of interest to the practising clinician are those patients who present with particular conditions that can give rise to ED, such as diabetes, pelvic injuries, cardiovascular problems and renal failure. These, as well as specific anatomical conditions that cause ED (such as Peyronie's disease, congenital anomalies and phalloplasty), are discussed.

This *Textbook of Erectile Dysfunction* provides an invaluable source of up-to-date information for the clinician treating patients with ED. It is hoped that it will help them not only to pinpoint the correct diagnosis but also to initiate the appropriate therapy. In this way, the quality of life may be improved, not only of the many sufferers of ED but also of their partners.

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Preface

Erectile dysfunction has replaced the term impotence and is defined as the inability to obtain and maintain an erection satisfactory for sexual activity. Erectile dysfunction (or impotence) has plagued men for thousands of years. It has been described since the ancient times in both art and literature. Erectile dysfunction appears in Greek cup paintings, the works of Ovid, the Old Testament of the Bible and the writings of Hippocrates and the Hindus. Opinions regarding its aetiology and risk factors, as well as treatment alternatives, are described in these ancient writings, including cures involving recipes for magical potions and aphrodisiacs. Early physicians and healers were intrigued by the medical treatment of erectile dysfunction using a variety of agents including bifurcated roots of certain plants resembling the human body such as mandrake and ginseng. Although their effectiveness was widely proclaimed, it appears that their effectiveness, as today, was primarily placebo. Masters and Johnson in *Human Sexual Inadequacy*, published in 1970, wrote 'true biophysical dominance in the etiology of impotence is not a frequent occurrence in any reasonably representative clinical series, the incidence of primary physiological influence of impotence is indeed of minor consideration'.

Because sexual function has long been submerged in social and cultural taboos, research into the physiology, pathophysiology and treatment of erectile dysfunction has lagged behind other medical endeavours. Over the past two decades, however, clinical and basic science research has elucidated the physiology of erectile dysfunction in the penis and central nervous system and has led to an improved understanding of this essential bodily function. Similarly, advances in pharmacology, material sciences, surgery, and psychological counselling have combined to improve treatment modalities for restoring erection. In the past two decades, basic research into smooth muscle physiology has progressed and neurotransmitters have been identified to clarify the mechanisms for erectile function. Similarly, new drugs and surgical procedures as well as penile prostheses have been designed for treatment of this major medical condition. With the advent of new oral agents specifically designed to manipulate neurotransmitters in the corpus cavernosum and central nervous system, a revolution in the treatment of erectile dysfunction has begun.

In this textbook, the Editors have assembled an international group of authors whose contributions of recognized authority have been carefully chosen for each chapter in this volume. Each author has been able to bring to the subject significant experience in their area of erectile dysfunction, and to share with the readership this experience and skill in a particular area of reporting. Although the reader will notice some repetition in subject matter, this overlap will serve to demonstrate differences among various authors in approaching the evidence of erectile dysfunction and its management. The clear, concise and complete discussion of erectile dysfunction in this textbook has been made possible by the fine work of the individual contributors, each of whom has provided material that is instructional and valuable to all scientists, physicians and health care providers interested in erectile dysfunction, whether at the beginning of their practice or experts in the field of erectile dysfunction. Owing to the rapid increase in research, knowledge and changes in management of erectile dysfunction, the authors have been able to place skilfully newer technologies for the investigation and management of erectile dysfunction into their proper perspective. This textbook is organized to take the reader in a logical fashion from basic science, epidemiology, clinical evaluation, to treatment of basic and subtle causes of erectile dysfunction. Currently available management techniques are included, as well as discussion of specific clinical problems in erectile dysfunction requiring the expertise, care and skill of urologic surgeons, specialist physicians and psychotherapists.

The Editors hope that the *Textbook of Erectile Dysfunction* will serve its readership by reviewing the science of erectile dysfunction; by discussing controversies in its basic science, diagnosis and management; and by carefully reviewing the field of knowledge of erectile dysfunction for those at all levels of accomplishment in this new and rapidly advancing field.

The Editors would like to acknowledge the efforts of the individual contributors, each of whom has synthesized complex subjects and provided material that will be instructional and valuable to all interested in erectile dysfunction. They also express their sincere appreciation to John Harrison at Isis and to Christine McKillop, medical writer and Heather Russell, copy editor, for their assistance, encouragement and enthusiasm in completing the *Textbook of Erectile Dysfunction*.

C. Carson, R. Kirby, I. Goldstein

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