



## PEYRONIE'S DISEASE: A COMPREHENSIVE NARRATIVE REVIEW

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## ABSTRACT

Peyronie's disease (PD) is an acquired fibrotic disorder of the tunica albuginea characterized by penile deformity, pain, and potential sexual dysfunction. This narrative review synthesizes current evidence on the epidemiology, pathogenesis, clinical manifestations, diagnosis, and management of PD. Affecting approximately 5% of men, PD progresses through active and chronic phases, with significant physical and psychological impacts. Diagnosis relies on clinical evaluation and imaging, particularly ultrasound, to assess plaque characteristics. Non-surgical treatments, such as intralesional collagenase and penile traction therapy, are effective during the active phase, while surgical options, including plication, plaque incision with grafting, and penile prosthesis implantation, are reserved for stable disease with severe deformities. Despite advances, challenges persist in managing residual symptoms and psychological burden. A multidisciplinary approach remains critical for optimizing outcomes and improving quality of life.

**KEYWORDS :** Peyronie Disease, Penile Deformity, Erectile Dysfunction, Collagenase, Penile Prosthesis.

## INTRODUCTION

Peyronie's disease (PD) is a localized fibrotic disorder of the tunica albuginea, leading to penile deformity, pain, and, in many cases, sexual dysfunction. First described by François Gigot de la Peyronie in 1743, this condition significantly impacts patients' quality of life, both physically and psychologically. The disease is characterized by the formation of fibrous plaques within the tunica albuginea, resulting in curvature, shortening, or other penile abnormalities that can compromise sexual intercourse. Despite advancements in understanding and management, the exact etiology remains unclear, with current evidence pointing to a multifactorial interplay of genetic predisposition, microtrauma, and aberrant wound healing. PD progresses through an initial active phase, marked by inflammation and pain, followed by a chronic phase, where deformities stabilize but persist. This narrative review aims to comprehensively discuss the epidemiology, pathogenesis, clinical manifestations, diagnostic strategies, and therapeutic options for PD, synthesizing insights from the most recent evidence to aid clinicians in managing this complex disorder (1).

## Methods

This narrative review was conducted by systematically searching four databases: PubMed, Scopus, Embase, and Cochrane Library. The search strategy included the following keywords: "Peyronie's disease," "penile deformity," "fibrotic plaques," "erectile dysfunction," and "tunica albuginea." Boolean operators (AND, OR) were used to optimize search specificity and sensitivity. Inclusion criteria were articles published in English within the past 20 years, focusing on epidemiology, pathogenesis, clinical manifestations, diagnosis, and treatment of PD. Exclusion criteria included studies with limited sample sizes, animal models, and those lacking peer-reviewed data. Articles were screened by title and abstract, followed by a full-text review of eligible studies. Of these, 15 references were selected based on methodological rigor and relevance to the review objectives.

## Epidemiology and Pathogenesis: Insights into Disease Onset and Progression

The prevalence of PD is estimated to be around 5% in men, with rates varying across populations and clinical settings. Studies suggest that its occurrence increases with age, affecting approximately 1.5% of men in their 30s, up to 6.5% in those over 70. The higher rates in older populations may reflect accumulated microtrauma and reduced tissue repair capacity. PD is frequently underreported due to embarrassment or misdiagnosis, particularly among men not sexually active or those attributing symptoms to aging (2).

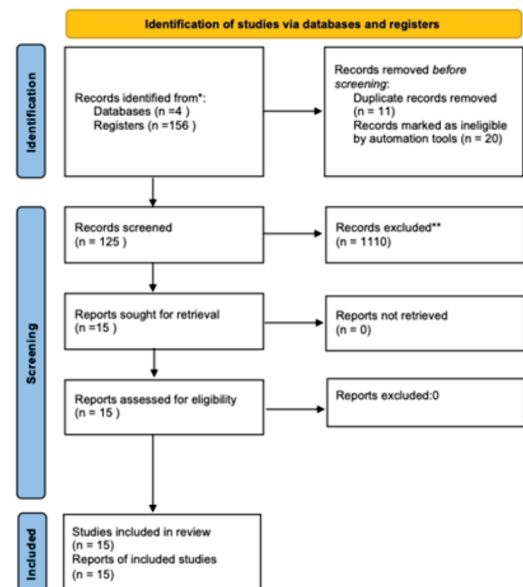


Figure 1. PRISMA.

The etiology of PD is multifactorial. The disease is hypothesized to result from repetitive, often unnoticed, microtrauma to the penis during sexual intercourse. In genetically predisposed individuals, this leads to aberrant wound healing. The inflammatory response includes fibrin deposition, overexpression of transforming growth factor-beta (TGF-β1), and dysregulated fibroblast activity. These factors promote plaque formation within the tunica albuginea, altering its elasticity and anatomy. Over time, plaques may calcify or ossify, exacerbating deformities and compromising erectile function (3).

Notably, PD shares pathophysiological features with other fibrotic conditions, such as Dupuytren's contracture. Up to 21% of PD patients exhibit this hand deformity, indicating a potential genetic or molecular link. Comorbidities like diabetes, hypertension, and smoking are also prevalent in this population but are primarily associated with coexistent erectile dysfunction rather than directly influencing PD severity. Understanding these mechanisms underscores the importance of early intervention to mitigate disease progression (4).

## Clinical Manifestations

PD presents with a spectrum of symptoms, primarily penile

deformity, pain, and sexual dysfunction. The disease evolves through two phases: an active inflammatory phase and a chronic stable phase. The active phase is marked by progressive curvature, pain during erection, and palpable plaques. Pain, typically localized to the plaque, resolves in most cases within 12 to 24 months, regardless of intervention (5).

Penile deformities in PD are diverse, including dorsal, lateral, or ventral curvatures; indentation; hourglass narrowing; and shortening. In severe cases, these abnormalities render penetrative intercourse difficult or impossible. Erectile dysfunction (ED) is reported in 20-50% of patients with PD and can result from several factors, including vascular compromise, cavernous fibrosis, and performance anxiety (6).

Psychological distress is a critical yet often overlooked aspect of PD. Many patients experience depression, lowered self-esteem, and strained interpersonal relationships. Partners may also report dissatisfaction due to the loss of intimacy and challenges in maintaining a sexual relationship. These psychosocial impacts highlight the need for holistic management approaches addressing both physical and emotional well-being (7).

### Diagnosis

The diagnosis of PD is primarily clinical, based on patient history and physical examination. Key symptoms include penile plaques, curvature, and pain. A thorough history should document the onset, progression, and impact of symptoms, including sexual dysfunction and psychological distress. Physical examination focuses on identifying palpable plaques and assessing penile deformities during erection. Patients are often asked to provide photographs of their erect penis, capturing the angle and extent of curvature (8).

Ultrasound is the imaging modality of choice for confirming PD. It allows for the characterization of plaques, including their size, location, and degree of calcification. Color duplex ultrasound, combined with pharmacologically induced erection, provides additional insights into penile vascular status, particularly when reconstructive surgery is being considered. Other imaging modalities, such as computed tomography or magnetic resonance imaging, are rarely required but may be useful in atypical cases (9).

Differential diagnoses include congenital penile curvature, chordee, and rare conditions like penile neoplasms. Urology referral is recommended for definitive diagnosis and management, particularly for patients with severe deformities or those considering surgical intervention (9).

### Management

The management of Peyronie's disease (PD) requires a patient-centered, multidisciplinary approach, encompassing observation, medical therapy, and surgical intervention based on disease progression, severity, and individual needs. The primary goals are to alleviate symptoms, correct deformity, and improve sexual function, while addressing the emotional and psychological impacts of the disease (10).

#### Non-Surgical Management

##### Observation

Observation is suitable for patients with minimal curvature ( $<30^\circ$ ) that does not impede sexual function. Educating patients about the chronic nature of PD and setting realistic expectations are crucial. Regular follow-up allows timely intervention if symptoms worsen (10).

##### Medical Therapy

Medical management is most effective during the active inflammatory phase. Oral treatments, such as pentoxifylline, target fibrotic pathways to stabilize plaques. Intralesional therapies, including collagenase clostridium histolyticum

(CCH), are the mainstay for reducing curvature. CCH enzymatically degrades collagen within plaques and has demonstrated significant improvements in penile curvature in clinical studies (11).

Adjunctive therapies, such as penile traction or vacuum devices, play a vital role in preserving or restoring penile length and improving curvature. Psychological counseling is integral to address the emotional distress often associated with PD (11).

#### Surgical Management

Surgery is indicated for patients with stable disease lasting over 12 months and deformities that impair sexual function. Procedures are tailored to individual anatomy, severity of curvature, and erectile function (11,12).

##### Plication Surgery

Plication involves shortening the convex side of the penis to achieve straightening. It is minimally invasive, has a high success rate, and is suited for curvatures  $<60^\circ$ . However, it may result in penile shortening, which patients should be counseled about preoperatively (12).

##### Plaque Incision and Grafting

Severe curvatures ( $>60^\circ$ ) or hourglass deformities often necessitate plaque incision and grafting. The technique involves incising the fibrotic plaque and placing a graft to restore penile anatomy and length. While effective, this procedure has a higher risk of erectile dysfunction (ED) due to neurovascular bundle manipulation (12).

##### Penile Prosthesis

For patients with coexisting severe ED, penile prosthesis implantation is an effective option. Inflatable prostheses offer superior outcomes in terms of functionality and aesthetics. In cases of complex deformities, prosthesis placement may be combined with manual modeling or grafting to achieve optimal results (12,13).

#### Postoperative Care and Outcomes

Postoperative care focuses on pain management, prevention of infection, and gradual resumption of sexual activity, typically within 6-8 weeks. Patients are instructed to monitor for complications such as infection or residual curvature. Follow-up appointments ensure proper healing and provide opportunities for addressing concerns (14).

Outcomes from surgery are generally favorable, with high rates of satisfaction among both patients and partners. Nonetheless, potential complications such as penile shortening, persistent curvature, or new-onset ED necessitate thorough preoperative counseling. Additionally, psychological support remains essential to address any residual distress (15).

### CONCLUSION

Peyronie's disease (PD) is a complex fibrotic disorder with significant physical, psychological, and social implications. Early recognition and tailored management are essential to minimize disease progression and optimize patient outcomes. Non-surgical therapies, such as intralesional collagenase and penile traction, offer effective options during the active phase, while surgical interventions remain critical for stable and severe cases that compromise sexual function. Advances in understanding PD's pathogenesis, including the role of microtrauma and dysregulated wound healing, have improved treatment approaches. Nevertheless, challenges remain in addressing persistent symptoms, psychological distress, and post-treatment complications such as erectile dysfunction. A multidisciplinary strategy combining medical, surgical, and psychosocial care is vital for comprehensive

management. Future research should focus on refining therapeutic techniques and exploring novel pharmacological targets to enhance treatment efficacy and patient satisfaction, ultimately improving quality of life for those affected by PD.

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