Chapter 37

# Evaluation of the Male with Erectile Dysfunction

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## 37.1 Introduction

The evaluation of the male who presents with erectile dysfunction (ED) can be one the most impactful visits in the long-term health for the patient. As illustrated in this chapter, ED has a number of important implications in overall men's health. ED may be the only symptom that convinces a man to seek medical advice, which he may have avoided for many decades. This can be described as a "delicate" or "sensitive" topic for many men as feelings of masculinity, vitality, and self-worth are often wrapped up in sexual performance. Furthermore, cultural norms have served to stifle open discussion of mores and sexual function. The issue of penetrative sex or intercourse is rarely discussed by men. It is important to remember that a man presenting to a physician's office with ED may have needed to build up a significant amount of courage to come forward, often not only needing to speak to the provider performing the evaluation, but also a number of other staff including call centers, schedulers, medical assistants, nurses, etc. The goal of the ED evaluation is to elucidate the emotional and physical well-being of the patient and to provide a safe and comfortable environment that allows the clinician to perform a proper and complete evaluation. Moreover, we have found many patients lack an understanding of the etiology of their ED, and part of the evaluation should include detailed patient education on how lifestyle and medical comorbidities contribute to ED.

### 37.1.1 Epidemiology

Worldwide prevalence studies estimate that approximately 20% of men will experience ED [1]. Prevalence increases as men age, with 1–10% of men younger than the age of 40 experiencing ED, ranging to up to 50–100% of men between the ages of 70 and 90 [2]. Projections estimate that the prevalence is increasing and will continue to increase in the coming decades as the boomer generation ages [3].

The increased prevalence of ED associated with age can be correlated to the increased prevalence of medical comorbidities. While the causes of ED can be multifactorial, there is strong evidence that specific comorbidities impacting blood flow and vascular endothelial function significantly increase the risk of having erectile dysfunction [4]. These comorbidities, which are increasing in the US population overall, include obesity, diabetes mellitus, hypertension, dyslipidemia, and cardiovascular disease.

Improvements in ED can be achieved by lifestyle changes, such as weight control, smoking cessation, a healthy diet, and exercise, which play a complementary role in ED management [5]. The management of specific comorbidities may also help improve ED. Treatment of obesity and hyperlipidemia have been associated with improved erectile function, whereas the impact of treating diabetes and depression is less clear [6,7].

Many of these comorbidities are more easily understood through the concept of metabolic syndrome. The risk factors associated with metabolic syndrome closely correlate with risk factors for cardiovascular disease, stroke, and heart attack, and significantly overlap with the most common conditions associated with ED. The defining characteristics of metabolic syndrome in men include an increased weight circumference greater than 102 cm (40 in), a triglyceride level greater than 150 mg/dL or being on a statin, a high-density lipoprotein (HDL) level less than 40 mg/dL, a blood pressure greater than 130/85 mmHg or being on an antihypertensive, and a fasting blood glucose level greater than 100 mg/dL. If a patient has three of the five listed criteria, a diagnosis of the metabolic syndrome can be made [8].

### 37.1.2 Public Health Implications

Erectile dysfunction has been found to be highly predictive of cardiovascular events in men less than 60 years old. Young men, who were not originally captured as part of the Framingham longitudinal heart study, are at risk as well. Younger patients presenting with ED should prompt screening for the presence or risk of cardiovascular disease, which might have otherwise have gone unevaluated. Erectile dysfunction can be considered both a marker of endothelial dysfunction, involving the nitric acid dependent vasodilation pathway, as well as a marker of atherosclerosis affecting penile blood flow. The manifestation of this dysfunction is then ED, which can be a harbinger for subclinical coronary artery disease (CAD) and a precursor for cardiovascular events [9]. While widespread invasive cardiac screening is not cost-effective for all patients, calculation of cardiovascular risk estimates based on known algorithms is important (atherosclerotic cardiovascular disease [ASCVD] risk calculator) [10]. Proper evaluation and screening has implications for overall societal well-being, quality of life, economic productivity, and formulation of public

**Table 37.1** Erectile dysfunction risk factors

| Condition | Multivariate adjusted odds ratio |
|---|---|
| Antidepressant use | 9.1 |
| Antihypertensive use | 4.0 |
| Diabetes mellitus | 2.9 |
| Obstructive urinary symptoms | 2.2 |
| Hypertension | 1.6 |
| Benign prostate enlargement | 1.6 |
| Current cigarette smoking | 1.6 |
| Increased body mass index | 1.5 |
| Physical inactivity | 1.5 |
| Cardiovascular disease | 1.1 |
| Hypercholesterolemia | 1.0 |

*Source:* Reproduced from *Campbell–Walsh Urology*, 11th ed. [36].

health strategies to improve preventative medicine and decrease healthcare costs. Further, proper identification of ED, leading to treatment and management, has implications of mental health, and modifiable lifestyle factors.

## 37.2 Initial Detection

### 37.2.1 Screening

Erectile dysfunction can be understood as a complex blending between anatomic, physiologic, and behavioral processes that occurs through the context of a man's beliefs and values, which then informs the concept of sexuality overall and how it relates to sociocultural mores. This in turn is informed by the nature of the relationship with his partner, the quality of that partnership, and the partner's beliefs and values about sexual activity. In this complex human context, ED is conceptualized as the inability to attain and/or maintain sufficient penile rigidity for sexual satisfaction [11]. Understanding this definition can help to inform who needs to be treated but also how patients are evaluated.

The critical first step is simply asking patients about their sexual function. As mentioned previously, many male patients are reluctant to talk openly about issues of sexual dysfunction. The onus is on the healthcare provider to ask and screen for these issues. It is of upmost importance that providers take a proactive approach to sexual function rather a passive one. Likewise, patients with identifiable risk factors, such as in metabolic syndrome, are likely to experience ED (Table 37.1). These men in particular should be screened [12].

In summary, ED is a risk marker for the presence of treatable underlying medical conditions that, left untreated, reduce quality and length of life (e.g., undiagnosed diabetes and cardiovascular disease). In addition, ED can negatively affect a man's mental health, his relationship, and his general well-being. The presence of ED, therefore, provides an opportunity to potentially address multiple issues that affect a man's general health [11].

### 37.2.2 Sexual History

An important part of the initial evaluation is establishing a detailed baseline of sexual function and history, which will allow the healthcare practitioner to set goals and expectations. Erectile dysfunction may only be the one component of a complicated sexual history. Initial understanding should start with the context in which the ED occurs and determine if it is related to particular situations, or whether it occurs alone and/or with a sexual partner. Following this, an understanding of how the patient approaches his interpersonal and sexual relationships is imperative. One should determine the quality of the patient's current relationship and any new or long-standing relationship difficulties. Furthermore, exploring patient sexual interests and desires will help to tailor treatment options and dictate therapeutic pathways.

Often a patient's partner may blame the patient for lack of desire or interest. It can be very helpful to include the sexual partner in the discussion and education regarding ED. The partner may also provide either corroborating or differing information in the history. These questions may help determine if performance anxiety is playing a role in the ED. Often the extent of the partner's involvement in evaluation in treatment may help to predict treatment success or failure. Understanding the health of the partner and interest in improving the ED might provide significant insight into the nature of the problem.

Developing a safe space that emphasizes trust is an important component to building the physician–patient relationship in sexual medicine. The patient must understand that discussions are confidential. This allows the patient to be able to fully express the nature and extent of the dysfunction. This starts with a line of questioning from the practitioner that is non-judgmental and does not assume heteronormative behaviors. A clinician who is open and understanding will develop a more therapeutic relationship with the patient.

Basic questions characterizing the ED are paramount, including the circumstances in which erections do or do not occur, including inquiries regarding presence or absence of morning erections, and whether there is a difference in erections during self-stimulation and partnered interactions. Further inquiries should include timing of onset of ED, severity, and an assessment of self-understanding of causes of the ED. Additional inquiries should include attempted treatment options thus far, including both pharmacologic, mechanical, and over-the-counter supplements or naturopathic herbals [13].

Discussion over a period of several visits may be necessary in order to obtain clear understanding of the exact nature of the problem. Frequently, patients will generalize their complaints into a category of ED. Assessment of desire, orgasm, and ejaculation should be performed to determine if possibly another aspect

of sexual function is truly the cause of distress. Frequently, men characterize premature ejaculation as ED. Clarification of this matter has important therapeutic implications.

### 37.2.3 Questionnaires

Validated questionnaires help to provide insight into the extent of the ED. Having baseline values for screening questionnaires provide clinicians and patients with measures of calculable success.

One of the mostly widely used questionnaires is the Index of Erectile Function (IIEF). This questionnaire has been decreased in length to five questions for more practical clinical use and is most commonly used in the form of the IIEF-5 or the Sexual Health Inventory for Men. This questionnaire uses a scale to classify ED as none, mild, mild to moderate, moderate, and severe. The Brief Male Sexual Function Inventory similarly scores the components of sexual function; sexual drive, erectile function, orgasmic function, problem assessment, and overall sexual satisfaction (Table 37.2) [14]. A number of other validated questionnaires exist to assist in the evaluation and management of ED. One is not necessarily better than the other, but practice consistency and longitudinal follow-up with repeated use of the questionnaires can provide useful treatment measures of success.

## 37.3 Medical History

### 37.3.1 Comorbidities and Medications

Metabolic syndrome, preexisting cardiovascular disease, and common disease conditions associated with aging may help point to etiologic causes of ED. Close scrutiny of medical comorbidities will identify modifiable lifestyle factors that, when corrected, may result in resolution or improvement in ED.

If the patient has diagnosed diabetes mellitus, a discussion of blood glucose control is necessary, as many patients do not correlate diabetes management with ED. Many have likely already been counseled on the long-term impact of diabetes on eyesight, coronary disease, and renal disease, but often are unaware of the sexual side effects of poor glucose control [15].

Detailed understanding of any preexisting CAD or peripheral vascular disease should be elucidated. This includes specific understanding of prior interventions of percutaneous coronary angioplasty, number, location, and type of coronary stents, endovascular aneurysm repair, peripheral vascular stenting, or open vascular bypass. Also, a review of systems focusing on an assessment of symptoms associated with congestive heart failure, CAD, shortness of breath with exertion, chest pain, or claudication-type pain is necessary [16]. Again, patients may be uninformed regarding the correlation of vascular disease and ED.

The presence of hypertension, dyslipidemia, or other endocrinopathies including hypogonadism or hypothyroidism should also be explored [17]. Compliance with the medical management of these conditions should be discussed and documented. This serves as another opportunity for patient education on the impact that these comorbidities have on ED. Patients may falsely believe that all ED is related to hypogonadism and that simple correction of low testosterone will result in normalized erectile function.

Further medical and surgical history should focus on identification of neurologic injury, spinal cord injury, or a history of trauma to the genitals, back, or pelvis. Also, a detailed accounting of spinal column surgery, pelvic surgery including prostate and rectal surgery, radiation treatments to the pelvis, as well as history of chemotherapy is compulsory. Understanding the nature of the possible cavernosal nerve injury will help guide treatment options.

A number of medications have been implicated as the cause or contribution to ED. The list of specific medications is long, but general classes of medications associated with ED include antihypertensives, antiarrhythmics, antidepressants, diuretics, antihistamines, Parkinson's disease medications, opiates, and muscle relaxants [18]. While many of these medications cannot be easily discontinued or substituted, patients should be educated on their impact on sexual function.

### 37.3.2 Social History/Lifestyle Factors

Modifiable lifestyle factors have been known to contribute significantly to ED. Patients should be questioned on their occupation, whether or not they perform shift work, their amount and extent of physical activity and exercise, sleep patterns, cigarette use, and drug use.

Obstructive sleep apnea is implicated in both ED and hypogonadism. Simple screening tools such as STOP-Bang are useful to determine whether a patient should be referred for sleep study [19]. This quick screening method stands for snoring, tired (feelings of daytime fatigue), observed (stopped breathing, choking, gasping), pressure (treated for high blood pressure), body mass index (of greater than 35 $kg/m^2$), age (greater than 50), neck (size larger than 40 cm), gender (male). Elevated scores determine the risk of obstructive sleep apnea. Patients should also be questioned on their quality and duration of sleep, as this influences energy, mood, and desire [20].

Patients should be counseled on the implications of cigarette smoking, alcohol intake greater than two drinks a day, as well as recreational drugs as this also is associated with worsening ED. The mechanisms of these lifestyle factors are likely related to endothelial injury resulting in damage to the vasodilatory mechanism of cavernosal arteries.

Sedentary lifestyle has been associated with ED as well as aerobic exercise linked to improvements in erectile function [21]. Changes in diet have also be shown to improve ED. A study of diabetic men demonstrated that the risk of ED was reduced with every additional serving of fruits and vegetables [22]. The Mediterranean diet has been associated with lower risk of ED and dietary counseling should be focused on increasing intake of fruit, vegetables, nuts, and whole grains, while reducing red meat and processed meats [23].

**Table 37.2** The Brief Male Sexual Function Inventory

**Section A. Interest**

A1. Let's define sexual drive as a feeling that may include wanting to have sexual experience (masturbation or intercourse), thinking about having sex, or feeling frustrated due to lack of sex.
During the past 30 days, on how many days have you felt sexual drive?
A2. During the past 30 days, how would you rate your level of sexual drive?
A3. Consider a scale from zero to ten, where zero is no sex drive at all and ten is the best level of sex drive a person could have, what number would you give to your level of sex drive in the past 30 days?

**Section B. Function**

B1. During the past 30 days, how frequently did you awaken from sleep with at least a partial erection?
B2. During the past 30 days, how frequently did you awaken from sleep with a full erection?
B3. During the past 30 days, what is the most erect (or hard) your penis has become at any time?
0 [ ] no erection at all
1 [ ] partial erection – not capable of penetration even with manual assistance
2 [ ] partial erection – capable of penetration with manual assistance
3 [ ] nearly full erection – sufficient for penetration without manual assistance
4 [ ] full erection
B4. Over the past 30 days, how often have you had partial or full sexual erections when you were sexually stimulated in any way
B5. Over the past 30 days, when you had erections, how often were they firm enough to have sexual intercourse?
B6. How much difficulty did you have getting an erection during the past 30 days?
B7. How much difficulty did you have keeping an erection during the past 30 days?

**Section C. Ejaculation**

C1. In the past 30 days, how much difficulty have you had ejaculating when you have been sexually stimulated?
C2. In the past 30 days, how much semen did you ejaculate when you climaxed?
C3. How much are you concerned about the amount of semen you ejaculate?
C4. In the past 30 days, how much did you consider the amount of semen you ejaculate to be a problem for you?

**Section F. Summary**

F1. In the past 30 days, to what extent have you considered a lack of sex drive to be a problem?
F2. In the past 30 days, to what extent have you considered your ability to get and keep and erections to be a problem?
F3. In the past 30 days, to what extent have you considered your ejaculation to be a problem?
F4. Overall, during the past 30 days, how satisfied have you been with your sex life?
F5. How did you feel about your level of sexual drive during the past 30 days?
0 [ ] terrible 1 [ ] unhappy 2 [ ] mostly dissatisfied
3 [ ] neutral or mixed (about equally satisfied and dissatisfied)
4 [ ] mostly satisfied 5 [ ] pleased 6 [ ] delighted
F6. How did you feel about your ability to get and keep erections during the past 30 days?
F7. How did you feel about your ejaculation during the past 30 days?
F8. Overall, during the past 30 days, how have you felt about your sex life?

*Source:* Reproduced with permission from O'Leary M., et al., A Brief Male Sexual Function Inventory for urology. *Urology*. 1995;46(5):697–706.

## 37.4 Physical Exam

The cornerstone of any physical exam should include assessment of vital signs, including height, weight, and blood pressure, and calculation of body mass index. Waist circumference measurement has important implications as a risk factor for metabolic syndrome and a marker of cardiovascular risk [17].

A generalized head to toe exam should be performed with a focus on the cardiovascular system including auscultation of the heart, evaluation of the lower extremities for edema, and palpation of peripheral pulses. Additional auscultation of the carotid arteries and abdominal aorta and palpation of femoral arteries should be performed to evaluate for the presence of a bruit. Presence of any of these findings should prompt cardiac evaluation and point to a significant vasculogenic cause of the ED.

Particular focus should be paid to androgenization and evaluation of the presence of gynecomastia. This might point to pituitary derangements.

A detailed genitourinary exam should include an evaluation of testicular size, penile stretch length, and the palpation of the shaft of the penis for the presence of penile plaques associated with Pyronine's disease. Additionally, assessment should include penile sensation testing. Disorders of sensation

or absence of bulbocavernosus reflex point to neurologic cause of ED. Abnormalities of genitalia would point to congenital causes of ED and sexual development including Klinefelter syndrome.

## 37.5 Diagnostic Testing

### 37.5.1 Laboratory Evaluation

The purpose of laboratory testing should be to identify and screen for any modifiable factors that may be contributing to ED. Furthermore, it will assist in risk stratification of patients for cardiovascular disease. A basic set of blood work includes a lipid panel with both total cholesterol and HDL level, total triglycerides, a fasting blood serum glucose, and a total testosterone level. We have found great benefit in measuring bioavailable testosterone and free testosterone. Many men will often have low or low normal total testosterone, but have disease states resulting in low levels of sex hormone binding globulin, which result in normal levels of bioavailable testosterone [24]. Testosterone levels should be drawn in the morning, preferable before 10 a.m. due to diurnal variation [25]. If the testosterone level is found to be less than 300 ng/dL, repeat levels should be drawn, along with luteinizing hormone and prolactin to help determine potential etiologic causes of hypogonadism [26].

### 37.5.2 Penile Function Evaluation

A helpful adjunct in the assessment of ED is specific vascular evaluation. This can help differentiate between psychogenic causes and vascular causes of ED. It may also differentiate between arterial insufficiency and venous leak. This adjunctive testing is often helpful in young, otherwise healthy men for which other identifiable causes for ED are not apparent.

The duplex doppler penile ultrasound is one such adjunctive measure of penile function. A rigid erection is induced by intracavernosal injection of vasodilatory medications such as prostaglandin, papaverine, and phentolamine. The type of medication, combination, and dosing should be adjusted so as to induce a full rigid erection. Erection quality should be measured and rated with the help of the patient. High-resolution ultrasound along with doppler ultrasonography is then used to measure the flow velocity within the cavernous arteries. Abnormal arterial peak systolic velocity less than 25 cm/second is suggestive of arterial insufficiency while veno-occlusive disease is suggested by an end diastolic velocity of greater than 5 cm/second. Additional measurements should include diameter of the cavernous arteries, the presence of penile curvature extent, and Peyronie's disease plaque calcification if present [27].

### 37.5.3 Cardiac Risk Assessment

As we have emphasized, the coexistence of ED and cardiovascular disease is strong, often in men without any overt symptoms of angina or shortness of breath with exercise. All men presenting with a complaint of ED should be regarded at potential risk for significant cardiovascular disease, therefore these patients should be particularly screened (Figure 37.1). New onset ED may precede symptoms of CAD particularly in younger men as vascular ED and CAD may be manifestations of the same disease. A flow limiting arterial plaque is more likely to manifest itself earlier in the penile caversonal arteries that are approximately 1–2 mm, while coronary arteries are 3–4 mm in diameter, and therefore more likely to manifest symptoms of a flow limiting plaque much later in the disease course [28]. Early identification and treatment may prevent future cardiac events [29].

The first step in a cardiac risk assessment is establishment of risk stratification. Evaluation and treatment should only be performed after quantitative risk assessment. We have found online risk calculators to be informative and easy to use. The calculator should be based on the 2019 American College of Cardiology/American Heart Association Guideline on the Assessment of Cardiovascular Risk [10]. This calculator estimates the 10-year risk of a first atherosclerotic cardiovascular disease event (e.g., stroke or myocardial infarction). The risk calculators utilize a combination of demographics (age, gender, and race), cholesterol levels (total cholesterol and HDL), blood pressure (systolic and diastolic), whether or not the blood pressure is treated with medication, and risk factors of diabetes mellitus and smoking history. The risk calculator can then stratify patients into categories of low risk (<5% risk of event),

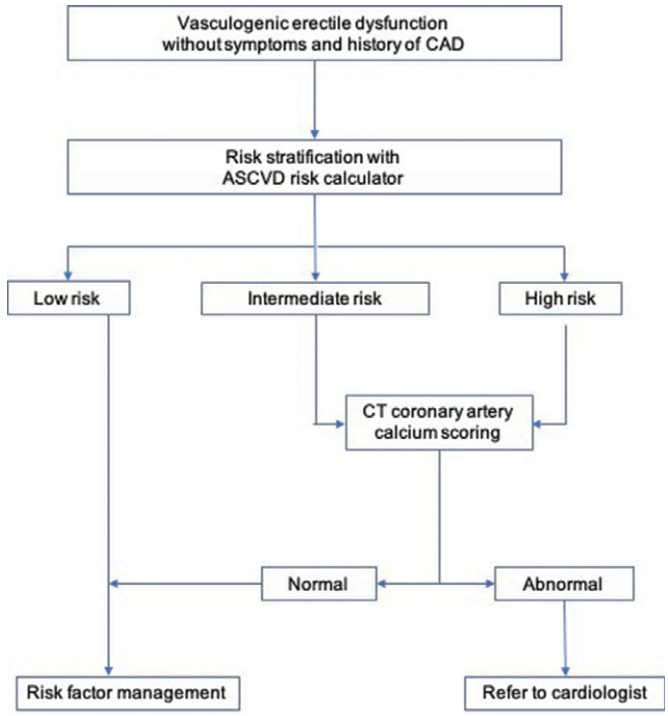


**Figure 37.1** Algorithm for cardiovascular assessment in a patient with ED

| Using 10-year ASCVD risk estimate plus coronary artery calcium (CAC) score to guide statin therapy | | | | |
|---|---|---|---|---|
| Patient's 10-year atherosclerotic cardiovascular disease (ASCVD) risk estimate: | <5% | 5–7.5% | >7.5–20% | >20% |
| Consulting ASCVD risk estimate alone | Statin not recommended | Consider for statin | Recommend statin | Recommend statin |
| Consulting ASCVD risk estimate + CAC | | | | |
| If CAC score =0 | Statin not recommended | Statin not recommended | Statin not recommended | Recommend statin |
| If CAC score >0 | Statin not recommended | Consider for statin | Recommend statin | Recommend statin |
| Does CAC score modify treatment plan? | ✗ CAC not effective for this population | ✓ CAC can reclassify risk up or down | ✓ CAC can reclassify risk up or down | ✗ CAC not effective for this population |

**Figure 37.2** Coronary artery calcium
Reproduced with permission from Greenland, et al. Coronary calcium score and cardiovascular risk. *Journal of the American College of Cardiology*, 2018;72(4):434–447.

borderline risk (5–7.5% risk of event), intermediate risk (7.5–20% risk of event), and high risk (>20% risk of event).

Men in the high-risk group should be referred to the cardiologist and would benefit from high-dose statin therapy. Men in the borderline and intermediate risk groups benefit from more intensive screening for CAD and benefit from treatment of cardiovascular risk factors, such as statin lipid-lowering medications and aspirin (Figure 37.2). These men are at risk of silent obstructive or future CAD. A noninvasive method of screening for these patients is the coronary artery calcium score. This is determined through a cardiac computed tomography (CT). A noncontrast CT of heart is obtained and the amount of calcified plaques is determined and converted into a scoring system. The coronary artery calcium score has been shown to closely correlate with risk of an atherosclerotic cardiovascular disease event [30]. Patients with elevated coronary calcium Agatston score (>100) should be referred to a cardiac specialist for further risk stratification and possible further diagnostic testing [31,32].

### 37.5.4 Psychological Evaluation

Comorbidities of depression and anxiety have strong correlations with ED [33]. Furthermore, the treatment of these conditions with pharmaceuticals can have strong effects on erectile function. A number of validated depression and anxiety questionnaires are available to assist in screening patients for comorbid psychological conditions. One such tool is the Patient Health Questionnaire [34]. This is a validated self-administered questionnaire that has been found to be a sensitive and specific measure for depressive disorders. The benefits of the questionnaire are in its relative brevity and reliable and valid measure of depression severity.

In-depth discussion and exploration of sexual performance anxiety is a valuable and necessary component of the evaluation of ED. It represents a large majority of ED complaints and can be independent or concomitant with vasculogenic ED. It occurs when anxiety about sexual performance leads to impairment of the sexual response in particular relaxed vasodilation penile blood flow. It is commonly associated with other anxiety disorders, including social anxiety, panic disorder, generalized anxiety disorder, obsessive compulsive disease, and body dysmorphic disorder.

If the patient has a regular partner, partner evaluation is a key part of a complete psychological evaluation. The partner can provide corroborating information and can often give additional insight into the nature and scope of the problem. It is also helpful to bring them into the therapeutic relationship as bridging understanding of the condition leading to ED will help manage treatment options and goals.

We have found sensate focus therapy, or structured touching exercises, to be both helpful in treatment of sexual performance anxiety but also in diagnosis. This therapy helps couples understand and explore the natural and physiological patterns of sexual responsiveness [35]. The techniques used in sensate focus help patients understand the fear of inadequacy that allows them to recognize their own anxious thoughts and feelings. After evaluation we recommend the couple work with a trained sexual therapist and continue a structured sensate therapy program.

## 37.6 Conclusions

Evaluating the male with ED includes a detailed and comprehensive patient history and a focal physical exam. Attention should be paid to development of a therapeutic relationship

with the patient and with consideration paid to a shared decision-making process. Evaluation should be performed in a nonjudgmental atmosphere. This will allow for the patient to freely express the nature and extent of his ED and will allow for a more comprehensive treatment plan of available options and therapeutics. The physician–patient relationship should not be diminished, as this rapport will allow for a strong bond and a foundation for which to introduce, emphasize, and support the lifestyle changes that often drive ED and can improve it over time. This results in motivated patients who are committed and responsive to suggestions of regular exercise, efforts at weight loss, healthy eating, and smoking cessation.

Of utmost importance is the evaluation of cardiac risk factors. For many men, seeking care after the development of ED might be their first encounter with the healthcare system since their childhood. A properly balanced assessment will result in important long-term implications for the overall health of the patient and future morbidity. This is a unique opportunity to intervene in a patient's health and put them on a path to improved health and well-being.

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