Erectile dysfunction has multiple causes; most commonly the causes are mixed, a combination of physical and physiologic dysfunction. Two hypothetical case presentations provide the context for a discussion of the neurologic basis of erectile dysfunction and sexual dysfunction from the perspective of osteopathic medicine’s holistic approach. Both offer osteopathic physicians the challenge of correcting structural, biological, and chemical defects to restore normal function. One of the cases is representative of patients who do not tell their physicians about sexual dysfunction unless their physicians specifically ask, and even then, these patients are most likely to lie to protect their self-esteem. The second hypothetical patient is representative of those patients who consult their physicians for any reason other than sexual dysfunction, expecting their physicians to figure out the real problem. Both of the hypothetical patients require not only support, but also education and counseling to motivate them to adopt healthier lifestyles and choices. Both would benefit from osteopathic manipulative treatment to correct structural abnormalities, and an oral medication such as a phosphodiesterase type 5 inhibitor offers both patients a good and easily accepted treatment option for erectile dysfunction.

Case Presentation 1

“Bob,” a 54-year-old trucker, comes into the physician’s office for a first-ever visit at about 4 PM, just 15 minutes before the office closes. He is a typical 54-year-old man complaining of back pain. The pain runs down both his legs and has been hurting him for months; but, now the pain has become so severe that he has difficulty getting in and out of the cab of his truck. Bob also talks about his fatigue and weakness, and he says that he does not sleep well. Even when his hectic work schedule allows, he still cannot sleep. Bob has chronic headache and chronic “heartburn,” both of which recur nearly all the time.

This patient is not conscientious about his health, nor is he an ambassador for healthy living, health awareness, or disease prevention! He drinks 8 to 10 cups of coffee a day. He smokes more than one pack of cigarettes per day and has done so since he was 15 years old. He is proud of the fact that he drinks less than a six pack of beer a day now and that he quit the “hard stuff.” Bob thinks he is doing well! He brags of the fact that if he takes a proprietary brand of caffeine-containing tablets that aid in staying alert and awake and other stimulants, he can get by on an average of 5 hours sleep a night and still drive his truck 12 out of every 14 days; he makes a pile of money.

Bob’s diet is a nutritional disaster. He lives on fast food. He eats too much fat, too much salt, no vegetables unless it is in his Bloody Mary mix, and he is deficient in most of the recommended essential nutrients. He last exercised in high school when he played a little football. Sounds like Al Bundy, right? And the fact that Bob is 50 pounds heavier than he used to be does not worry Bob; he does not think he is clinically fat. He thinks he is in fairly good shape. In fact, Bob thinks he is buff.

Bob is not impressed by the fact that his blood pressure was 150/90 mm Hg at his last physical examination; he thinks that is normal.

Bob carries a “bottle” in the truck because he has to urinate so often and he cannot afford to stop, but he considers that normal also. It is all right that he gets up a couple of times a night to go to the bathroom; after all, he drinks a lot of coffee and a lot of beer.

Bob is so clueless that he does not realize that his wife and children are miserable. His children are into substance abuse, his wife is having an affair, and both he and his wife are alcoholics. Bob is away from home so much of the time that he does not know that his wife has a “thing” going with a waiter at a restaurant where she eats out 3 days a week. Bob may have a little suspicion about that affair, but he is not going to reveal it to the physician.

The last thing in the world Bob is going to tell the physician about is his sex life.

Bob will not tell his physician about his sex life unless the physician asks, and then he is most likely to lie to protect his self-esteem!
Case Presentation 2

“Ted’s” case is a little different than Bob’s.

Ted is absolutely not having an excellent adventure along his current road of life! Only 42 years old, Ted is clinically depressed; he is moody and mean. He visits the office to talk to a physician because he is tired all the time. He is also having problems with his wife. He hates his job, and he is fed up with how hard he has to work every day and how little he has to show for his efforts.

He also wants to talk to his physician about his blood pressure, which is not well controlled. He is taking amiodipine besylate (10 mg/d). He also complains about his sleeping problems, his constant backache, and his lack of energy.

Ted is not going to tell the physician that his blood pressure is not controlled because he is not taking his medication; the physician will have to pry that information from Ted. He will not tell the physician about the two or three alcoholic drinks he has every night. And, if Ted is asked, he will admit to having the drinks, but what he will not reveal is that “a drink” is a 32-ounce cup of ice he fills up with whiskey every night. In Ted’s mind, he has only two drinks a day. The fact that it is 2 L per week is not what Ted considers significant.

Ted is not going to talk about his sex problem initially, though that is the real reason he is seeing a physician, because that is what he is really concerned about. He does not want the physician to know. He wants the physician to ask him without his telling the physician at the outset that he is having trouble “getting it up.” He is suddenly convinced that he is not satisfying his wife sexually, and he is afraid there is something wrong with him; he fears that he may be turning gay.

Ted is not atypical in the author’s world. Patients like Ted are going to consult their physicians for any reason other than sexual dysfunction and expect their physicians to figure out what the real problem is.

Neurologic Basis and Somatic Dysfunction in Erectile Dysfunction

The following discussion looks at the neurologic basis of erectile dysfunction (ED) and sexual dysfunction to see how it fits with osteopathic medicine’s approach to correction of structural dysfunction.

A nervous stimulus is required to initiate the sexual response system. The stimuli may start in the cerebral cortex, in the local nerve endings, or from stimuli originating in the spinal cord. Wherever it starts, the stimulus affects parasympathetic outflow from the sacral nerve roots S2 through S4. The stimulus travels through the paravertebral ganglion and the hypogastric plexus and ends up at the synaptic junctions at the endothelial lining of the vessels. Here, the parasympathetic stimulation results in increased nitrous oxide release. Nitrous oxide, through stimulation of the cyclic guanosine monophosphate (cGMP) pathway, inhibits both calcium release and stimulates reuptake of calcium within the cell, resulting in cavernous smooth muscle relaxation and penile engorgement. Regardless of how initiated, these are parasympathetic effects. If a patient has a somatic lesion, torsion, or a lumbosacral lesion, the source of the problem is correctable.

One of the described hypothetical patients is a truck driver. His job requires him to both sit and bounce, putting him at risk for somatic dysfunction. Even if he can achieve an erection, he will not be able to satisfactorily perform sexually if he has a somatic lesion in his lumbar or low thoracic spine. Sympathetic stimulation originating in the thoracolumbar junction, from T10 to L1, passing through the ganglion system and down into the pelvic plexus, is responsible for the muscle contraction sequence that begins in the testes and epididymides, runs down through the bulbospongiosus, the ischiocavernosus, and the transverse perineal muscles to allow ejaculation and climax.

Men equate sexual activity and satisfaction with the ability to achieve an erection and climax. For men, it is not sex if they do not have an erection and climax; it is much less an emotional response than it is in women. Cuddling and foreplay are not sex to a man. Rather, they are the “wrapping” that come along with the “real thing.”

Osteopathic physicians should do a thorough structural examination on their patients who have sexual dysfunction. They may be able to help many of these patients by treating them for a pathologic condition and the cause of their disease. Although the medications available to treat patients with sexual dysfunction are impressive, they are most often used for treating the patients for the effects and symptoms of the condition, but not the underlying pathologic condition.

Osteopathic manipulative medicine may correct the cause of a patient’s condition and relieve symptoms at the same time. When osteopathic physicians correct the structural and functional abnormalities, they create normality. The back and pelvis are regions commonly involved with repetitive strain injury such as that from lifting, pulling, tugging, and straining. To practice good holistic care, osteopathic physicians have to ask the right questions, be aware of the patient’s lifestyle, his culture, and his social structure. Physical and structural abnormalities may be related to emotional stressors or job stressors. These psychological abnormalities as well as physiologic abnormalities are likely to exist and to cause the patient’s disease. It is mandatory to ask the right questions. It all goes back to the classic history and physical examination. Eight or nine times out of ten, patients will tell their physicians what is wrong if their physicians ask the right question. It takes time, insight, and instinct to know there is something else they need to discuss.

Diagnosis

It is necessary to distinguish impotency from diminished libido. Physicians must distinguish emotional dysfunction from physiologic dysfunction and both from simple fatigue. Many people are tired. In the United States today, people have little sleep. Much tiredness is really fatigue, and all the Ginkgo biloba in the world is not going to correct sleep deprivation.

Erectile dysfunction has multiple causes; most commonly the causes are mixed, a combination of physical and physiologic dysfunction. It is like the old question of which came first, the chicken or the egg. If a man is sexually impotent,
he is probably going to become depressed. If he is depressed, he may become sexually impotent.

Shari R. Fine, DO, discusses in more detail the physiologic causes and pathophysiologic correlations of sexual dysfunction to other disease states, beginning on page 59 of this supplement. Physicians need to be aware that young persons who come into their offices with sexual dysfunction may well be giving their physicians a key for identification of physiologic causes such as diabetes or heart disease (Figure 1).

Sexual dysfunction, in the young especially, is a marker for endothelial dysfunction. It may be a marker for underlying coronary artery disease, insulin resistance, and developing diabetes. It generally is a guidepost to depression. Sexual dysfunction is the one thing men will consult their physicians about sooner rather than later. They may not come to the office to see about their blood pressure, which is silent generally; they may not know what their lipid levels are; they may not be aware that their symptoms are those of hypoglycemia, but they will see their physicians when they have sexual dysfunction. This revelation and awareness of sexual dysfunction and ED enable physicians to intervene with patients before they have severe mortality and possible early morbidity from underlying diseases if they are aware of the correlation and warning signs.

Among men between 40 and 69 years of age, those aged 60 to 69 have approximately a four times greater risk of erectile dysfunction than those 40 to 49 years old.1 Erectile dysfunction is primarily a disease associated with middle-aged and older men. It is not normal when seen in a younger person; therefore, physicians must determine why it exists and not just treat the symptom.

Figure 2 provides some key and important questions to be asked of patients in the workup for ED. Physicians should become familiar with the International Index of Erectile Function (IIEF). The IIEF domain scores will help to determine the degree of ED (Figure 3).

At some time in life, most men will have minor ED. When even mild dysfunction starts to interfere with day-to-day life, it becomes a problem. Problem here does not refer to what happens when a guy is in college and drinks two bottles of tequila and goes home with someone only to find out the next day that he passed out before he could perform sexually. The old adage about alcohol improving the desire and decreasing the performance is very true. Two bottles of tequila is brain dysfunction, not ED.

Vascular changes occur. Medications that are available to treat patients for ED are directed at vascular-mediated causes. Several drugs, including those for atherosclerotic disease, or functional changes associated with hypercholes-

terolemia, hypertension, and diabetes affect the function of the endothelium and the vascular supply to the penis. The effects of functional abnormalities on arterial and venous function is key to sexual dysfunction. Long-standing defects result in smooth muscle atrophy and further dysfunction. Fibrous cavernitis (Peyronie’s disease) is a classic example of structural change resulting in dysfunction. Organic defects commonly account for most dysfunction, and they respond well to treatment of both the underlying disease and the resultant impotent condition.

Treatment Options
Several options are available for the treatment of patients with ED. A comparison of some of these options appears in the Table.

Sex Therapy and Psychotherapy
Sex therapy is one option for some patients. Sex therapists may help some patients. However, multifold problems exist with sex therapy. First, this form of activity does not fit most people’s lifestyles, morals, and ethics in a monogamous society. Second and more important, sex therapy does not help to relieve the underlying organic or physiologic problem. Despite society’s prevailing opinion, most men do have a conscience; therefore, treatment frequently makes the problem worse in the long run as the psychogenic component comes into play.

Checklist
- Aging
- Hypertension
- Diabetes mellitus
- Benign prostatic hypertrophy
- Cardiovascular disease
- Smoking
- Depression
- Alcoholism
- Regional trauma or surgery
- Chronic neurologic disease
- Endocrinopathy
- Drugs

Figure 1. Pathophysiologic factors of erectile dysfunction.

Figure 2. Six of the questions on the 15-item International Index of Erectile Dysfunction. Questions relate to patient’s previous 4-week experience. (Source: Rosen RC, et al. Urology. 1997;49:822-830.)

Figure 3. The International Index of Erectile Function provides some key and important questions to be asked of patients in the workup for ED. Physicians should become familiar with the International Index of Erectile Function (IIEF). The IIEF domain scores will help to determine the degree of ED.
So most commonly, sex therapy is not going to relieve the underlying problem, and long term, it may make the condition worse.

Psychological counseling is critically important in treatment of most patients for depression and anxiety. It is not only effective, but it is also necessary for controlling or relieving ED related to anxiety and depression. However, because psychological counseling has a high relapse rate, it often requires repetitive sessions continued for a long time. An important part of such therapy is to help patients know themselves well and to have a good self-image.

Hormone Replacement Therapy

Hormone replacement—thyroid, insulin, or testosterone—can be important to restore normal function. For the most part, when hormone replacement is used to treat patients with sexual dysfunction, it is being used for problems with libido, generally not for erectile function. These hormones have great effects on libido (desire). Generally, hormone replacement is not a major treatment modality for ED.

Sexual dysfunction may occur in patients with severe left ventricular dysfunction, producing compromised cardiac output to the systemic or central circulation. Patients with other vascular diseases such as advanced atherosclerotic coronary artery disease or cerebrovascular disease as well as patients with such conditions as renal failure, sleep apnea, or chronic obstructive pulmonary disease (COPD) with hypoxemia may have abnormal sexual function.

Even when physicians properly treat patients for the underlying cause, the best they can achieve is controlled blood pressure, improved insulin resistance and stabilized diabetes, improved status of heart failure and cardiac output, better air exchange, and improved lung function. Yet, they may still need to treat patients with these well-managed conditions for sexual dysfunction.

Invasive Treatment Modalities

Invasive forms of treatment have varying degrees of success. Constriction devices and pump devices work in some men. They produce an unnatural erection associated with a great deal of pain. They are also associated with trauma to the penile structures with repeated use.

Transurethral prostaglandin therapy works well in many men. It is limited by the penile pain associated with it. Most men with ED do not find this treatment modality highly desirable.

Papaverine hydrochloride injections into the corpus cavernosum of the penis have been used with good success for many years. These injections are invasive and tend to produce penile fibrosis and scarring after long-term use.

Prostheses and implants are an option when conservative treatment fails. They are inserted as a semi-rigid or a rigid device, they are inconvenient, and, being erect, they often interfere with day-to-day activities.

Vascular surgery, when available and when possible, may restore normal erections. Most of the time, however, the procedure is not successful because a basic structural problem persists in the smaller vessels. Even if blood flows from the aorta and the femoral and popliteal arteries, blood flow to the cavities of the corpus cavernosum is not normal.

Most men (approximately 80%) in the United States prefer a pill for treatment. They want something that works quickly and “very, very well.” A pill is easy and convenient.

Miscellaneous Oral Agents

Several nonspecific oral drugs have been tried with varying degrees of generally limited success. Men easily accept these drugs because they are noninvasive forms of therapy, easy to take, and have minimal side effects. In the majority of men, agents such as phentolamine, yohimbine, trazodone hydrochloride, and nutraceuticals are ineffective, having only a placebo effect on the psychogenic component of the disease. They have little pharmacologic effectiveness that can be reproduced in blinded studies. The phosphodiesterase type 5 (PDE-5) inhibitors, in contrast, are generally effective.
## Some Current Treatment Options for Men With Erectile Dysfunction (ED)*

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Disadvantages</th>
<th>Advantages</th>
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<tbody>
<tr>
<td><strong>Psychosexual therapy</strong></td>
<td>High recurrence rate</td>
<td>Noninvasive&lt;br&gt;Moderately successful&lt;br&gt;Resolves conflict</td>
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<tr>
<td><strong>Miscellaneous agents</strong></td>
<td></td>
<td></td>
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<tr>
<td>Yohimbine</td>
<td>Poor efficacy&lt;br&gt;Frequent systemic side effects</td>
<td>Noninvasive</td>
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<tr>
<td>Phentolamine</td>
<td></td>
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<tr>
<td>Trazodone hydrochloride</td>
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<td>Neutraceuticals</td>
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<tr>
<td><strong>PDE-5 inhibitors</strong></td>
<td>Contraindicated in men taking nitrates&lt;br&gt;Contraindicated in men taking α-blockers</td>
<td>Noninvasive&lt;br&gt;Enhance effect of sexual stimulation</td>
</tr>
<tr>
<td>Sildenafil citrate (25 mg, 50 mg, 100 mg)†</td>
<td>Adverse effects (flushing, dyspepsia, nasal congestion, elevation of creatine kinase level, myalgia, back pain)</td>
<td>Improves erections across all degrees of severity of ED&lt;br&gt;(blue-green) vision&lt;br&gt;Efficacy less established in patients with most severe ED&lt;br&gt;Improves erections across all degrees of severity of ED&lt;br&gt;Orally active agent&lt;br&gt;Long duration of action</td>
</tr>
<tr>
<td>Tadalafil (10 mg to 20 mg)†</td>
<td>Adverse effects (flushing, dyspepsia, nasal congestion, elevation of creatine kinase level, myalgia, back pain)&lt;br&gt;Efficacy less established in patients with most severe ED&lt;br&gt;PDE-5 inhibition at other sites&lt;br&gt;and cross-reaction in other tissues&lt;br&gt;Long half-life, need for dose adjustment in patients with renal insufficiency&lt;br&gt;Requires caution in men with unstable angina and ischemic cardiovascular disease</td>
<td></td>
</tr>
<tr>
<td>Vardenafil hydrochloride (2.5 mg, 5 mg, 10 mg, 20 mg)†</td>
<td>Adverse effects (headache, flushing, nasal congestion)</td>
<td>Most selective for PDE-5 of currently available PDE-5 inhibitors&lt;br&gt;Improves erections across all degrees of severity of ED and in difficult-to-treat patients&lt;br&gt;Rapid absorption&lt;br&gt;91% to 95% metabolized by fecal excretion&lt;br&gt;2% to 6% metabolized by urinary excretion&lt;br&gt;Can be taken with food and alcohol without clinical effect</td>
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<tr>
<td><strong>D1/D2 Dopamine agonist</strong></td>
<td>Minor side effects (nausea, headache, dizziness) generally on starting treatment</td>
<td>Sublingual administration&lt;br&gt;Acts within 20 minutes&lt;br&gt;Food and alcohol do not affect absorption</td>
</tr>
<tr>
<td>(centrally acting)</td>
<td></td>
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<tr>
<td>Apomorphine hydrochloride ‡</td>
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†Approved by US Food and Drug Administration for erectile dysfunction.
‡Investigational for erectile dysfunction.
Phosphodiesterase-5 Inhibitors

The PDE-5 inhibitors have been proved to be effective in blinded and crossover studies and trials in large numbers of men of varying ages and with multiple underlying physiologic conditions.\(^3-15\)

Currently on the market are three PDE-5 inhibitors approved by the US Food and Drug Administration (FDA): sildenafil citrate, vardenafil hydrochloride, and tadalafil. Some older drugs are being looked at to see what effect their off-label use may have on ED.

One of the most interesting of the drugs used off label is apomorphine hydrochloride. Heroin users talk frequently about a sexual orgasmic response and increased sexual performance with use of the drug. Because of such anecdotes, it becomes logical that apomorphine falls into the category of a drug that may improve sexual performance.

Phosphodiesterase isoenzymes are distributed throughout the body, each targeting different systems and organs. Compounds with PDE-5 inhibitors can be targeted to the sexual organs and sexual response. The side effects seen with the use of the PDE compounds can often be explained by the effects the drugs have on the chemical in nontarget organs, such as the blue-green haze that patients see with sildenafil because of its action on PDE-6, which is highly concentrated in the retina. Treatment of patients with ED requires compounds that affect PDE-5 and PDE-11. The systemic side effects of these medications occur because PDE is present throughout the body from the platelets to the brain. Therefore, it is difficult to specifically limit impact on a given system or organ. By specifically trying to better target PDE-5 in the genitourinary system, the PDE-5 inhibitors produce fewer side effects and today offer an advantage over some other drugs.\(^3-15\)

Three PDE-5 inhibitors are currently available worldwide; one of these compounds, tadalafil, is the most recent to be released in the United States. Of the three, vardenafil has the highest affinity for PDE-5. This affinity not only increases the drug’s effectiveness, but it also helps decrease side effects. The third compound, sildenafil, is the compound with which physicians are most familiar.

The half-life of the PDE-5 inhibitors is significant. Tadalafil is being called the “weekend drug.” Often, tadalafil is effective for 18 to 36 hours after a single dose. Its long half-life may create problems. It is cleared by the kidneys and therefore may decrease renal function, often necessitating dose adjustment.

All the PDE-5 compounds are absolutely contraindicated in men taking nitrates.

Sildenafil—Sildenafil has been on the market in the United States since 1998. It remains an effective and safe drug. Improvements to the base chemical compound has increased its effectiveness and limited side effects.

Sildenafil is a peripherally acting agent and the PDE-5 inhibitor in the United States with the most documentation of activity. Increased nitrous oxide mediates increases in cGMP by PDE-5 inhibition. The more cGMP present inside the cells, the more the penile smooth muscle relaxes, thus producing engorgement and penile erection. Dosing is from 25 mg to 100 mg 1 hour before intercourse.

Sildenafil has been proved to be effective across the entire spectrum of causes of ED. The drug is less effective in patients with more severe or persistent ED. Headache, flushing, dyspepsia, and nasal congestion are the most common of the well-known adverse effects of sildenafil. Classically, the drug is associated with blue-green visual changes that are due to its effect on PDE-6. Side effects are defined by sildenafil’s activity on PDEs other than PDE-5 or PDE-11 and in tissue other than that of the genitourinary system.

Dosage adjustment is necessary in patients with renal insufficiency because sildenafil has a narrow metabolic pathway. Doses greater than 25 mg should not be taken within 4 hours of taking an α-blocker because of the risk of hypotension and syncpe.

Vardenafil—Vardenafil has a half-life of about 5 hours. Different studies demonstrate an onset of activity from a minimum of 16 minutes to a maximum of 25 minutes.\(^6\) It is metabolized through three different pathways. Divergent metabolism is important because it limits the need for dosage adjustments in patients with either hepatic or renal failure, both of which are particularly common in aging patients.

Vardenafil is also a peripherally acting agent, working by increasing nitrous oxide through PDE-5 inhibition. Dosing is 2.5 mg, 5 mg, 10 mg, and 20 mg. Vardenafil improves erections across the entire spectrum of etiologies, as well. Data in patients with more severe ED are less established than those for sildenafil. Few data for studies in the United States are currently available.

The side effects of this drug are similar to those of other PDE-5 inhibitors in addition to the usual headache, flushing, dyspepsia, and nasal congestion that may occur with all the PDE-5 compounds, some patients may have an increase in creatine kinase as well as myalgia and back pain.

Renal function should be monitored in patients taking PDE-5 compounds until tolerance is established. Side effects of PDE-5 inhibitors generally speaking are defined by their activities on the different PDE sites widely distributed throughout the body, ie, the effect of sildenafil on PDE-6 and the resulting blue vision changes.

Because vardenafil has a long half-life, dosing will need to be adjusted in patients who have renal insufficiency. If a patient has a glomerular filtration rate of less than 60 mL/min, the dose will have to be adjusted. Dose adjustment should also be considered in patients who have metabolic abnormalities or hepatic dysfunction.

One of the problems commonly producing ED is benign prostatic hyper trophy (BPH), for which men are frequently treated with doxazosin mesylate or terazosin hydrochloride. Use of an α-blocker is a relative contraindication to use of a PDE-5 inhibitor. The prescribing information for vardenafil indicates that use of this PDE-5 inhibitor is absolutely contraindicated in men taking an α-blocker; prescribing information for sildenafil and tadalafil include a warning about this concomitant drug use.

Of all the currently available products, vardenafil has the greatest selectivity for PDE-5, which is present in the highest concentration in the genital organs of both males and females. Var-
denafil is also rapidly absorbed equally well on a full or empty stomach. Although neither the manufacturer nor the supplier advocate that patients consume alcohol when taking vardenafil, alcohol appears to have minimal effect on absorption of vardenafil. Both food and alcohol affect the absorption of sildenafil; however, data on the absorption and effectiveness of tadalaﬁl in the presence of both food and alcohol are limited. The fact that vardenafil is not affected by food or alcohol may be a major advantage in the real world where sexual activity is commonly accompanied by dining and drinking.

Vardenafil has a dual mechanism for metabolism. Whereas 91% to 95% is secreted in the feces, 2% to 6% is passed through the urine. Because aging is associated with an increased incidence of renal problems, the metabolism of vardenafil offers an advantage in the older population and in patients with renal dysfunction. Vardenafil has been shown to improve erections regardless of severity or etiology of ED.

Headache, flushing, dyspepsia, and nasal congestion are fairly ubiquitous with this compound as they are with the other PDE-5 inhibitors. When prescribing these compounds, physicians need to inform patients of the likelihood of the side effects as they can be signiﬁcant. The side effects are likely to be persistent and to recur.

Vardenafil has been shown to be the most effective of the PDE-5 inhibitors in improving erectile function in the most severely affected patients. Vardenafil also is the most effective at the maximum dose of the three compounds.

Most of the patients with ED have a mixed etiology for the condition. Vardenafil is effective essentially to the same degree in all patients, regardless of whether the underlying etiology is psychogenic or organic.

The drug is also effective in patients who are taking multiple medications, including most antihypertensive medications. Physicians cannot assume that it is the patient’s medicine that is causing the ED. Vardenafil has been proved to be just as effective in patients taking antihypertensive medication as in patients who are not taking such medication.

**Ethnicity and Erectile Dysfunction**

Certain ethnic groups have a higher incidence of ED, including African Americans and Hispanics. This higher incidence is most likely due to higher rates of untreated comorbid disease in these populations. The PDE-5 inhibitors are the oral treatment of choice and have been shown to be equally effective in all racial groups of patients, as well.

Thirty-two percent of patients reported adverse drug reactions (headache, flushing, rhinitis, and dyspepsia) compared with only 8.8% of those taking a placebo. Only 3% of subjects stopped taking the drug because of the adverse side effects. Most patients thought that the benefit outweighs the cost and tolerated the compound well. The incidence of serious adverse events was essentially the same as that for placebo.

In summary, vardenafil is the most potent of the PDE-5 inhibitors. It has an extremely rapid onset, 16 to 25 minutes. It is highly selective for PDE-5, and it is highly efficacious in difficult to treat populations such as patients with poorly controlled diabetes, patients who have undergone prostatectomy, and patients taking antihypertensive medications.

**Comment**

Currently, various treatment options are available for ED. Most of them are effective in some, if not all, patients seen in the primary care physician’s ofﬁce. Psychotherapy, as discussed, is effective in many men but has a high relapse rate.

Both of the two hypothetical patients described here clearly would beneﬁt from osteopathic principles and practice and holistic medical care. Both need not only support, but also education and counseling in an attempt to motivate them to adopt healthier lifestyles and choices. They may well need osteopathic manipulative treatment to correct structural abnormalities, as well as education in proper orthotic techniques to prevent recurrence of back pain.

Both Bob and Ted are good candidates for treatment with an oral medication such as a PDE-5 inhibitor. Vardenafil would be a good choice for patients such as Bob and Ted who drink alcohol and eat abundantly. The drug is effective in patients whether their condition is due to multiple possible organic causes or whether it is stress-mediated or psychologically mediated.

Evidence indicates a good safety proﬁle for vardenafil in patients with underlying heart conditions but who do not have unstable angina. The drug is effective in patients taking antihypertensive medications and in patients who have endothelial dysfunction, hyperlipidemia, diabetes, BPH, COPD, etc.

Sexual dysfunction, whether in men or women, is not a normal state. Thus, it is an excellent study for osteopathic physicians, giving them the challenge of correcting structural, biological, and chemical defects to restore normal function. Osteopathic principles of holistic treatment, including the use of newer medications such as the PDE-5 inhibitors, provide the opportunity to improve the lives of patients and perhaps diagnose other conditions before they produce damage that cannot be corrected.

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