

MASTERING MOBILITY

A GUIDE TO
WALKING WITH
CONDITIONS
THAT EFFECTS
GAIT



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“Continuous effort – not strength or intelligence – is the
key to unlocking your potential”

- Winston Churchill

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Parkinson's Disease and the Need for a Walking Cane

Parkinson's disease (PD) affects nearly one million people in the US. It is a progressive and chronic progressive movement disorder, meaning the symptoms will continue and worsen over time. The cause of PD is largely unknown, but researchers have found evidence that a toxin produced in the brain, DOPAL, is responsible for a series of cellular events that are the precursors to Parkinson's disease. DOPAL plays a key role in destroying dopamine neurons that trigger the disorder.(1) Though there is presently no cure for PD, there are treatment options available. Surgery and medication can help to alleviate the symptoms.

As more nerve cells die, the amount of dopamine supplied to the brain is decreased. This, in turn, sends chemical messages to the part of the brain that controls coordination and movement. As Parkinson's progresses, the quantities of dopamine produced inside a person's brain is decreased which subsequently prevents the patient from being able to control normal movement.(2)

How Parkinson's Progresses

The progressive symptoms of Parkinson's Disease include:

- Rigidity of the muscles
- Tremors
- Slowness of movement
- Postural instability

These symptoms may be mild, in the early stages of the disease, but will steadily become more debilitating and intense. Rates of progression in patients vary, and the progression of the symptoms of the disease may take 20 years or longer to fully manifest. (3)

Parkinson's Progression Scale

Many doctors use a tool named the Hoehn and Yahr Scale to allow patients to assess their disease progression. The progression of PD is delineated based on the following stages:

Stage 1: Parkinson's symptoms only affect one side of the patient's body.

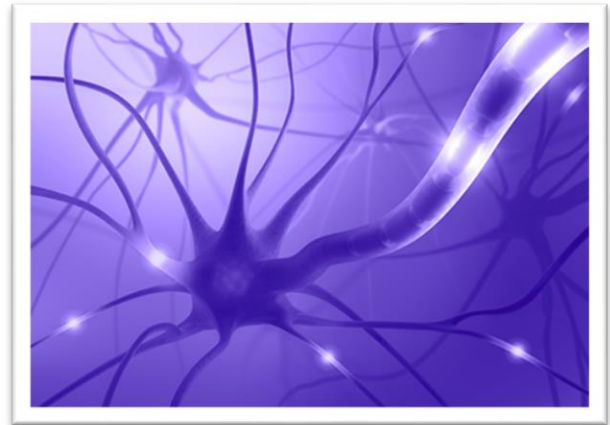
Stage 2: Symptoms start to affect both sides of the body, but balance remains intact.

Stage 3: Symptoms of PD in the patient are mild to moderate. Balance is impaired, but the patient can function independently.

Stage 4: Patients at this stage suffer from severe disability, yet continue to stand or walk without assistance.

Stage 5: The patient becomes bedridden or wheelchair-bound.

A doctor will be able to tell a Parkinson's patient how far along they are on the Hoehn and Yahr Scale; however, there is no accurate way to tell when they will progress to the next stage. Patients who experience worsening symptoms can expect that their physical functioning will decline, as well. (4)

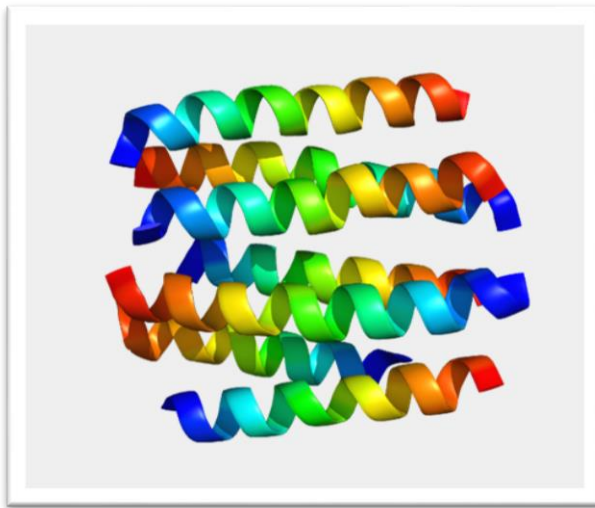


Conventional Treatment

Parkinson's disease has no cure, but there are treatments that can ease the symptoms. When the symptoms begin affecting a person's functioning, the medications Parcopa or Sinemet will usually be able to effectively and significantly reduce symptoms for about one to five years — even longer in about 25 % of patients.

Many PD patients, on medication for their symptoms, experience dyskinesia, involuntary movements that happen when the medication dose has reached peak performance. Patients need to have their medication adjusted when this occurs. Often a change of medication is also required. Symmetrel is an example of an additional medication that may be added to the regime. Surgery may also help at this stage of the disorder.

When patients begin experiencing the most advanced stages of PD, they will experience severe flare-ups of dyskinesia and alternating with severe symptoms, even with adjustment to medications. The best treatment when this occurs is often surgery. Deep brain stimulation, as the surgery is called, involves the implantation of electrodes in the brain. The electrodes are connected to an external device that is similar to a heart pacemaker that helps control the electrical impulses, thus influencing flexibility and movement.(5)



Potential Treatment Options

There are promising new treatment options available for the treatment of Parkinson's, according to researchers at Harvard-affiliated McLean Hospital. Their study found that when fetal dopamine cells were transplanted into the brains of patients with PD, they were able to remain functional and healthy for up to 14 years.

The findings could lead to new treatments and better therapies for patients. They could also reduce the reliance on dopamine replacement drugs.(6)

Gait Disturbance

Patients suffering from the progression of PD have difficulty with walking. Their gait is often characterized by a typical slowness of movement (hypokinesia), small shuffling steps, and even total loss of movement (akinesia) in extreme cases. Patients with this disorder have reduced stride length and walking speed when walking from one place to another and when cadence rate and double support duration is increased.

The patient will experience difficulty initiating walking, but will also have difficulty stopping once they have started. This is caused by muscle hypertonicity.(7)

Characteristics of Abnormal Gait

Heel to Toe Strike

In cases of normal gait individuals, the heel will strike the ground before their toes do. For patients that have PD, the entire foot is placed on the floor at the same time. In advanced stages of the disorder, the patient's toes will touch the floor before the heel does. Additionally, patients show a marked reduction during foot lifting, the swing phase of their gait, which results in a smaller clearance between the ground and the toes.

Vertical Ground Reaction Force

For a person with a normal gait, the vertical ground reaction force (GRF) plot possesses two peaks – the first peak is when the foot hits the ground, and the second is caused by their push-off force from the floor. For patients with PD, the shape of the vertical GRF signal has abnormal characteristics.

In early stages of the disorder, reduced peak heights (or force) are encountered for contact of the heel contact and push-off phase. For more advanced stages, the gait characteristics are with small, shuffling steps. Patients with PD exhibit only a singular, narrow peak in the vertical GRF signal.

Freezing and Falls of Gait

Freezing and falls of gait are episodic phenomena that are commonly seen in Parkinson's patients. Both symptoms are often seen in the advanced stages of the disorder but seen less commonly in the earlier stages.

Freezing of gait is a temporary episode for PD patients that usually lasts less than a minute and is described by patients as feeling as if their feet are glued to the floor. Importantly, freezing of gait will often lead to falls mainly due to a sudden change in posture.

Postural Sway

In the end stages of PD, a postural instability in the upright stance is commonly seen in patients. This condition limits the ability for the patient to maintain their balance during everyday tasks, such as walking and standing up after sitting. This inability to effectively balance the body's center of mass throughout the base of support combined with the increased rigidity of the patient's body movements is what causes patients with advanced Parkinson's to fall.

Walking Aids

With the diagnosis of Parkinson's disease comes the necessity to adjust the activities of daily living to enable management of the physical instability that comes along with the disease. There are many types and brands of walking aids that increase stride, normalize walking, and help with freezing. If balance is particularly off in the morning, before taking your dosage of Parkinson's medication, it is a good rule of thumb to keep a cane by the bedside to help with walking safely to different rooms in the house.

The use of a walking cane is especially useful in crowded areas, such as a shopping mall or grocery store, and should be encouraged. In addition to helping with balance, the cane is a visual cue to a passerby to maintain safe interpersonal space.

Also, walking sticks can be helpful for trail walkers with PD that have a stooped posture, as they are designed to be taller than the person that uses them. If a person with PD has more frequent episodes of falling, it may become necessary for them to switch over to a walker. Before purchasing any mobility aids, it is recommended to consult with a licensed physical therapist to get a proper fit and the training to use them effectively(9)

Useful Tips for Walking Canes

1. A rubber-tipped, straight cane is recommended.
2. The hand grips on the cane should be adjustable and comfortable to provide good support.
3. Laser canes work well if the patient is experiencing freezing of gait. (10)

Conclusion

Parkinson's disease comes with health issues that can often be difficult to manage, but there are medications and treatments that can help minimize symptoms throughout the different stages of the disease. There are many options available to assist a patient with walking--the walking cane being one of the chief options to turn to initially. Although patients that suffer from PD can be fearful of a need to rely on others for important tasks, a walking cane and other mobility aids can broaden their options for independence and bring them peace of mind.

Obesity and Gait Abnormalities

Obesity is one of the greatest epidemics of our time. Not only are adults suffering from an increase in obesity, but children are too. In the past two decades, the rate of obesity has risen dramatically, with over 35% of adults and 17% of children and adolescents suffering from the disease. (10) Obesity-related diseases can affect every organ system in the human body. The heart, lungs, endocrine and musculoskeletal system bear the greatest burden from an obese body habitus.



Causes of Obesity

While there are a number of factors that contribute to obesity, the bottom line comes down to math. The body must burn at least as many calories as it consumes, to maintain a steady body weight. When the number of calories consumed becomes greater than the number of calories burned, weight is gained. If this process continues to occur, over the course of an extended period of time, a person will gain weight. If the process is not corrected, the weight gain will spiral out of control until eventually the person becomes obese.

It seems simple enough: eat fewer calories than you burn and you will fend off obesity. While theoretically this is true, genetics, metabolism, the type and variety of physical activity undertaken and socioeconomic factors can play a big role in whether or not you develop obesity.

The best way to avoid becoming obese is to monitor your weight and Body Mass Index.

Body Mass Index

The management of weight is serious business. Having the tools to monitor and control body weight can allow you to minimize your risk of developing obesity and the side effects that come along with it.

Body mass index and waist circumference are used to gauge the health risks of your current weight, the severity of the obesity and/or the potential for long term health risks. The Center for Disease Control and Prevention defines obesity as a Body Mass Index (BMI) of 30 or higher. (11) The Body Mass Index is a calculated number that takes into account weight and height. Though BMI is highly reliable, it can be somewhat misleading in athletes. Increased muscle mass adds weight in the highly conditioned athlete which can artificially inflate the body mass index. The Center for Disease Control provides an easy way for everyone to track their BMI, in the comfort of their own home. (12)

Disease States Linked to Obesity

Cardiovascular Disease and Stroke

The risk of cardiovascular disease increases with increased weight. Hypertension, elevated cholesterol and elevated triglycerides often go hand in hand with obesity. All of these diseases states act singularly and synergistically to increase your risk of cardiovascular disease and stroke. In turn, a decrease in body weight by as little as 20% can decrease your risk of suffering from cardiovascular disease by as much as 40%.

Obesity is a very serious and expensive medical diagnosis. The US spends over 150,000 billion dollars, annually, on obesity and obesity-related diseases.

Diabetes

Obese individuals are three times as likely to develop insulin resistance or type II diabetes as those of normal weight. Of those diagnosed with type II diabetes, greater than 80% of the patients are considered obese. The rate

increases even further when a family history of type II diabetes is present. This startling link between the two disease states is being extensively studied, as the rate of obesity drives up the rate of type II diabetes. Every three seconds someone is diagnosed with type II diabetes.(13) Though a family history of type II diabetes is certainly a predisposing factor to suffering from the disease, the lack of physical activity and our increasingly sedentary lifestyle is certainly playing a role in the increasing rate of the disease. The bottom line is if you are able to prevent obesity, you can reduce your risk of acquiring type II diabetes by nearly 100%, which makes type II diabetes a completely avoidable disease state.



Cancer

Though the link between obesity and cancer is known, the etiology is believed to vary considerably. Excessive and prolonged levels of hormones, primarily estrogen are thought to increase the risk of a reproductive system cancer diagnosis. Secondarily, estrogen is believed to be tied to increased deposits of subcutaneous abdominal adipose tissue. This increased fat deposit is also linked to rising rates of obesity.

Sleep Apnea

The rate of patients diagnosed with sleep apnea has been dramatically increasing, over the past 2 decades. Sleep apnea, often secondary to obesity, increases the risk of hypertension, stroke, peripheral vascular disease and even sudden cardiac death.

What else...

Obesity is considered to be a broad sweeping etiologic factor in many other disease states, including:

- Varicose Veins
- Gout
- Gall Bladder Disease
- Pickwickian Syndrome
- Abdominal Hernia

Treatment

The treatment of obesity continues to be at the forefront of medical research. A multifaceted approach to management of the disease state starts with the prevention of the disease. For those individuals that are already suffering from obesity, a three-tiered approach includes:

- Nutrition
- Physical Activity
- Emotional Support

It is important to note that not all patients fit the same treatment mold. It often takes many attempts to find a weight loss program that works and is sustainable for a lifetime of weight management.

Gait Disturbance

One of the most important factors in managing obesity is encouraging an exercise plan. The majority of bariatric medicine specialists initiate walking plans for their patients. Though quite necessary, this can present a very specific set of problems. Clinically obese patients are often physically limited in their ability to ambulate. It is not uncommon for physicians to prescribe an ambulatory assistance device. The addition of a walker or cane, for stability, can be the physical impetus needed to get the obese patient up and moving. The long journey truly does start with a single step, in the case of obesity.

Fatigue

Obesity leads to deconditioning and deconditioning leads to fatigue. The greater the fatigue, the more difficulty the patient will have with ambulation. It is common to see an

obese individual sitting on a bench in the mall or park, waiting for their companions to return. The sad reality is that obesity prevents physical activity and conditioning. The vicious circle need to be broken with the initiation of activity, but this is easier said than done.

Balance Problems

Nearly all individuals carrying increased weight have balance issues. Without the addition of movement to the treatment protocol, the patient will likely be unable to lose weight, reduce the risk of additional medical problems and subsequently reduce the risk of gaining back the lost weight. Often these balance issues may be addressed satisfactorily by adding a physical assistance device, such as a walker or cane.

Mobility Aids

Carrying around extra weight, especially to the point of being diagnosed with obesity, can significantly alter your ability to ambulate. With one of the mainstays of obesity treatment

being the initiation of an exercise program, it is important that you seek out a stability device to help you implement this component of your program.

A safe and effective method of walking should be the initial goal of treatment for the diagnosis of obesity. This can be easily accomplished with the addition of a mobility device, such as a walking cane or walker.

Conclusion

Obesity presents a specific set of challenges. The take away message is that obesity doesn't have to rule your life. Opportunities to enhance your life, by adding the necessary lifestyle changes and ambulatory device, must be taken seriously and implemented as soon as you realize weight has become an issue.

Diabetes and the Need for Walking Canes

Diabetes is a metabolic disease state, whereby the body is unable to produce adequate amounts of insulin. Two types of Diabetes occur. Type 1 Diabetes is often seen in younger individuals who lack the ability to produce any insulin. Type 2 Diabetes is typically seen in middle age to older individuals, who are overweight and physically de-conditioned. Type 2 diabetes consists of a diminished ability to produce adequate levels of insulin in the bloodstream. The lack of insulin, in Type 1 and 2 Diabetes, results in elevated levels of blood glucose. As of 2007, there were 25.8 million adults and children in the United States that suffer from the disease, accounting for over 8% of the total population.



Diabetic Neuropathies

Diabetes can cause a family of disorders, known as diabetic neuropathies. These disorders are brought about because patients diagnosed with diabetes frequently develop nerve damage, over time. The nerve problems from this disorder occur throughout every organ system in the body, and about 60 to 70% of patients with diabetes suffer from some form of neuropathy. They can develop nerve problems at any given time, but the risk of nerve issues elevates with age and increased diagnosis time.

Types of Diabetic Neuropathy

There are four classifications of diabetic neuropathy, with the most common being peripheral neuropathy.

- Autonomic
- Peripheral
- Proximal
- Focal

Disease Progression

Peripheral neuropathy can cause nerve damage in the arms, hands, legs and feet. The hands and feet will most likely be affected in a patient before their arms and legs. Symptoms of peripheral neuropathy are worse at night and may present as:

- Insensitivity to temperature or pain and numbness
- Tingling, prickling, or burning sensation
- Cramps and stabbing pains
- An extreme sensitivity to touch
- A loss of coordination, position sense, and balance

People with peripheral neuropathy may also experience a loss in reflexes and muscle weakness, particularly at their ankles, that leads to a change in their gait. They sometimes experience the occurrence of foot deformities, such as a collapse of the mid-foot and hammertoes, as a result.

Neuropathy Treatment

The first thing a healthcare provider will want to do for a patient with diabetic neuropathy is to bring their blood glucose levels within a normal range, thereby preventing any further nerve damage. Actions that can be taken to regulate blood glucose levels include meal planning, monitoring blood glucose levels, exercise and insulin therapy. Patients may find their symptoms worsening when they initially stabilize their glucose levels. As time passes, the maintenance of stable, lower glucose levels

may enable the neuropathic symptoms to lessen.

The key to delaying and preventing the onset of additional problems is tight blood glucose control. Researchers are learning more about the root causes of neuropathy, and new treatments are becoming available that can help prevent, slow, and even reverse a patient's nerve damage.

Gait Disturbance

Diabetic patients often experience unusual and uncontrollable walking patterns, due to the progressive damage diabetes causes to the legs and feet. Patients with peripheral sensory neuropathy have a diminished ability to respond to potentially injurious stimuli, as well. They may also experience an atrophy of the intrinsic muscles of the foot, caused by motor neuropathy. This, in turn, causes instability of the anterior migration metatarsophalangeal joints and a gait shift to another area of the fat pad that is usually located right under the metatarsal heads. This anterior migration of the fat pad causes the forefoot to be more prone to injury when a patient is walking.

Gait Complications

Patients with diabetes often have trouble with foot ulcers. If they progress untreated, these ulcers can lead to permanent disabilities and complications. The role of exceeding, repetitive mechanical pressure, and decreased sensation to the plantar should be addressed, in order to prescribe specialized treatment. Very often high plantar pressures lead to the formation of ulcers and the breakdown of tissue. These lesions can be accompanied by infection and a progression to more severe problems such as gangrene and amputation.

As there is a tendency for patients with diabetic neuropathies to have abnormally increased plantar foot pressures, plantar pressure therapy has become a focal point in research and associated treatment recommendations. Healthcare providers must work with the patient to reduce peak plantar pressures on their forefoot while they walk, in order to effectively prevent and treat foot ulceration. Various strategies are used to reduce this type of pressures on the insensitive foot. Casts, therapeutic footwear, and

accommodative orthotic devices have been used in treatment and stabilization of the plantar pressures. An alteration of gait can also be quite useful in lessening forefoot peak plantar pressures in some patients.

Mobility Aid for Balance

Therapy for people who have elevated plantar pressure can involve the use of a mobility aid such as a cane or other assistive device, to lessen forefoot plantar pressures while walking. Walking aides are commonly used for rehabilitation of neuromuscular or musculoskeletal disorders, to provide the unloading of forces on the affected extremity and to help improve balance. The primary function of an aid, such as this, is to decrease the risk of falls and load on limbs and joints that are recovering from injury. The cane also functions as a conduit for sensory information and subsequent feedback to the patient.

Mobility Aid Study

In the study titled, Walking Patterns Used to Reduce Forefoot Plantar Pressures in People With Diabetic Neuropathies published by Physical Therapy: Journal of the American Physical Therapy Association, researchers conducted studies on the effect of the cane on a patient's gait. The studies indicated that the effect of using the cane in the ipsilateral hand vs. the contralateral hand when trying to offset pressures on the foot, may affect gait. Researchers used a portable in-shoe pressure system to measure plantar pressures at seven areas under each foot. The test subjects wound up decreasing the load on the plantar surface of their foot an average of 21.5% using a cane in the contralateral hand vs. 17% using a cane in the ipsilateral hand.

Using a cane in the contralateral hand led to the greatest unloading on the lateral side of the foot, at 35%, but the cane used in both hands only minimally unloaded the medial side of the foot at 14%. In addition, pressure was elevated on the big toe and metatarsals of the non-utilized foot at 21%.

The study suggested that the use of a cane in the contralateral hand, to offset a neurotrophic ulcer, has a bigger chance to be successful for fifth metatarsal ulcers than for first metatarsal ulcers. A cane's use, to offset the load on one

foot, stands a chance of putting the other foot at risk for developing an ulcer. It bears noting that the study was performed on test subjects who did not have impairments or known pathologies that would affect their gait. The conclusion of the study was that more studies were needed to determine whether the use of a cane would lessen forefoot plantar pressures for individuals with diabetic neuropathies.

Conclusion

The research regarding the use of a cane lessening forefront plantar pressure, for individuals with diabetes, remains inconclusive. It is recommended, however, that any patients having issues with their ambulation or balance use a walking cane or other mobility device. The healthcare provider, in order to avoid the associated dangers of falling, will commonly prescribe some variation of ambulatory assistance. Patients with diabetes that don't perceive a dysfunctional gait, but have what is known as "foot drop," are also candidates for ambulatory assist devices. In patients with foot drop, the toes of the foot may spontaneously drop forward and catch the floor, leading to the

patient tripping or falling. Due to the unexpected nature of peripheral disease manifestation in patients with diabetic neuropathy, these patients should consider adding a mobility device to their treatment regimen.



Multiple Sclerosis and Gait Abnormalities

Multiple Sclerosis is a chronic and debilitating disease that attacks the myelin sheath surrounding the nerves of the human body. Multiple Sclerosis is thought to be an autoimmune disease, whereby the body turns on itself and breaks down the myelin surrounding the nerve fibers. Myelin is a substance made up of multiple types of cells, one of which is cholesterol. Myelin acts as an insulator and propagator of electrical impulses. As damage to the myelin sheath occurs, the contact between the nerves covered by the myelin sheath and the brain and spinal cord become disrupted. This damage results in a lack of communication and subsequently effects the sensory and motor pathways of the human body. The disruption that occurs can result in sensory or motor deficits, diminished strength, lack of coordination, change of gait and ability to speak clearly.(17)

Disease Progression

The rate at which the human nerve demyelinates, once one is diagnosed with Multiple Sclerosis, is not predictable. Patients may live decades without any significant limitations of their motion or sensory acuity. Others may lose their myelin sheath quickly and in turn may experience a sudden and rapid decline of their sensory, motor and speech functions. To complicate matters, disease symptoms may vary depending on the time of year, down to the time of day.

Treatment

There is no known cure for Multiple Sclerosis. Treatment of Multiple Sclerosis occurs by managing the recurrence of symptoms, reducing the flare frequency and managing the severity of the disease flares.(28) The strategy of treating acute attacks is handled differently than the strategies instituted to slow the progress of Multiple Sclerosis. In addition, the treatment of disease symptoms affecting lifestyle issues are very important. Instituting methods to ease debilitating motor symptoms can be helpful when activities of daily living are being effected.

Gait Disturbance

One of the most significant issues of progressive Multiple Sclerosis is difficulty with walking. As is often the case with the disease process, the patient may be able to walk with only minor difficulty for many years. During this disease progression, the slow decline of motor function required for the process of walking is often insidious.

Multiple etiologies for gait disturbance include:

- Dizziness and Vertigo
- Sensory Changes
- Spasticity
- Fatigue
- Balance Problems

Dizziness and Vertigo

Dizziness and vertigo affect a patient's ability to ambulate indirectly. Though not a major motor issue, dizziness tends to cause a spinning sensation that leads to a motor imbalance. To make matters worse, current pharmaceutical therapies to treat the uncomfortable nature of vertigo, such as Benadryl and Antivert, produce side effects that increase the imbalance.

Sensory Changes

The feet and legs are particularly susceptible to numbness, in the patient with Multiple Sclerosis. This numbness provides the patient with an inability to feel the ground during the process of walking, leading to gait instability and the need for an external means of physical support. Because there is no pharmaceutical protocol that significantly reduces these symptoms, the addition of well-fitting, stabilizing shoes and the use of a cane can be very helpful.

Spasticity

Demyelination of the nerve sheaths is thought to be the culprit behind the increased muscle tone seen in patients with Multiple Sclerosis. The increased muscle tone leads to spasticity,

which then lends itself to stiffness and walking difficulty. Spasticity can range from barely noticeable to severe and most often affects the muscles of the lower body, including the buttocks, thigh and calf muscles.

Fatigue

Deconditioning, combined with overexertion, can impact

walking in the patient with multiple Sclerosis. Management of the fatigue and physical conditioning can aid in the reduction of these symptoms. Physical therapy, a regular workout routine and some adjunct physical support, can go a long way in minimizing the impact of fatigue on the patient with Multiple Sclerosis.

Balance Problems

There is no medication regimen that can manage balance issues, in the patient with Multiple Sclerosis. Balance problems can be minimized by a good physical therapy program, however the best management of balance issues is the implementation of a mobility aid.

Mobility Aids

With the diagnosis of Multiple Sclerosis comes the need to adjust the activities of daily living, as well as supply an adjunctive way to manage the physical instability that comes along with the disease. The need for walking assistance can sneak up on the patient. A patient's normal gait begins to sway or the ability to walk produces increasing or more rapid fatigue. Patients can spend years of decline without recognizing the need for assistance. Most Multiple Sclerosis patients with motor function issues are involved in ongoing physical therapy. Often it will be the physical therapist that recognizes the need for some form of mobility or walking assistance.

The time when a patient may require the use of a mobility assistant device will vary from person to person. The factors that should be taken into consideration when deciding whether or not to add a mobility device to the patient's daily regimen include:

- Does the act of moving from one location to another provoke stress or worry?

- Are the patient's feet so numb that they feel clumsy when walking?
- Does the patient remain house bound for fear of being unable to ambulate?
- Does the patient remain house bound for fear of being made fun of?
- Does the patient have a history of more than one fall in the past 30 days?
- Has there been a recent flair up of symptoms?
- Does the patient have a noticeable limp or gait imbalance?
- Does the patient require others to take their arm or help them balance, when walking?

If the answer to any of these questions is YES, it's most likely time to consider adding a mobility device to the management regimen.

There are several options to assist with the process of walking. A cane is often the first line of action for Multiple Sclerosis patient's with motor issues.

The biggest fear for some patients with Multiple Sclerosis is the fear of lack of control or the need to rely on others for daily tasks. A cane can offer independence and open up your options and provide peace of mind.

Assistance in fitting for a cane can be very important in the patient with Multiple Sclerosis. A proper fit and the training to use the cane effectively can often be found within the scope of services offered by a licensed physical therapist.

Conclusion

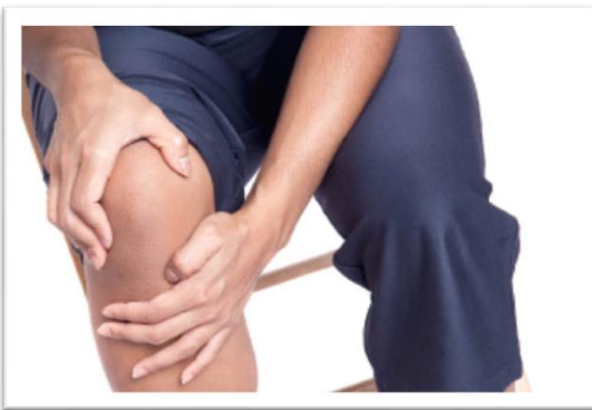
Multiple Sclerosis comes with some issues that can be difficult to deal with, but the diagnosis doesn't have to dictate how a patient lives their life or manages their daily activities. There are options available that can ease the management of the patient's day and provide them with the ability to be self-reliant and independent.

How Osteoarthritis Affects Gait

Arthritis is defined as a disorder that causes the joints of the body to become inflamed. There are over 100 varieties of arthritis, with Osteoarthritis (OA) being the most common. OA is caused by wear and tear and the eventual breakdown of cartilage inside the joints. This degenerative condition can happen to almost any joint in the body and ultimately results in decreased regeneration of joint cartilage. Areas in the body that are commonly affected are the weight bearing joints of the spine, knees and hips. OA is also known to affect other areas of the body, such as thumbs, fingers, the neck and big toes. OA is typically not found in other joints unless those joints are stressed or the patient has a history of suffering a previous injury involving that particular joint.(19)

Age Group and Gender Affected

There are about 27 million people in the United States that are affected with osteoarthritis. The risk of developing OA increases with age and as such, the majority of people over the age of 60 have it, to some degree. Though the incidence of osteoarthritis in patients under the age of 40, without a specific injury, is low, the risk of OA occurring increases with advancing age. The disorder is encountered most frequently in women over 50 years of age.(19)



Symptoms of Osteoarthritis

Symptoms of arthritis vary considerably, with the progressive deterioration happening slowly. The pain of the involved joint is typically

reduced upon awakening but often worsens as the day progresses. Patients often complain of swelling, pain and warmth of the joints. Stiffness is also frequently noted after prolonged periods of inactivity.

For patients that have advanced arthritis, there is often a severe loss of cartilage, leading to increased friction between the bony surfaces. This friction can produce significant discomfort, whether at rest or in motion. In addition, patients commonly have symptoms of pain after overusing the joint or after extended periods of inactivity. Some patients suffer a bony enlargement on the end and in the middle of the affected joint.(19)

Treatment of Osteoarthritis

The treatment protocol often depends on which joints are affected and the severity of the involvement. Treatment may involve medication, the proper supporting tools or exercise. Osteoarthritis symptoms and disease progression can often be managed by the use of proper footwear(20) or by the use of a walking cane. If a patient is overweight, losing weight will often improve the symptoms of OA.(19)

Effect of Osteoarthritis on Patient Gait

Osteoarthritis of the knees can play a significant role in advancing a patient's gait abnormalities. The disorder adversely affects the knees and associated gait, leading to a decrease in gait speed. The adverse symptoms of the affected knees, such as joint pain and deformity, as well as weakness in the muscles and musculoskeletal instability can cause the patient to expend more energy during their gait. The patient will then compensate by shifting their weight almost entirely to the medial compartment of the knee. As such, reducing the load on the medial compartment of the knee should be one of the hallmark treatment options utilized for these patients. (21)

Contralateral Canes Benefit Gait Most

The most common joint affected by osteoarthritis is the knee. Studies have shown

that the use of a cane, during walking, removes a significant amount of stress on the knees, thereby decreasing the risk of osteoarthritis progression in those particular joints. By decreasing the risk of the progression of the disorder, the likelihood of disability may be significantly reduced or prevented entirely.

The cane works by reducing the biomechanical load on the patient's lower extremity joints. The end result is to increase tolerance to exercise and independence, thus allowing an optimal gait and decrease in stress to the afflicted joints.

A recent study, using randomized controlled trials, studied patients with osteoarthritis of the knees and evaluated episodes of ipsilateral and contralateral cane use. The study demonstrated that the contralateral cane was better suited for use and effectiveness of managing the biomechanical load on the knee joints. A lower peak force on the affected area was required and as such reduced friction occurred. The use of the contralateral cane reduced the overall load on the medial compartment. The use of this type of cane also allowed for the affected lower limb to advance together with the patient's upper limb carrying the contralateral cane, resulting in normalcy in the gait pattern. The use of a cane significantly reduced medial knee loading and resulted in a 10% decrease in the knee adduction movement.(21)

Energy Expenditure Decreases

A cane can be used to take away some of the pain, improve function, and improve some aspects of the quality of life in patients that have osteoarthritis of the knees. Healthcare providers that prescribe the use of a contralateral cane should take into account that the associated expenditure of energy in the first month of use will be quite large, however the energy expenditure will be reduced going forward, as the patient adapts to its use.(21)

Exercise Recommendations for Patients

In the past, healthcare providers frequently recommended immobilizing the affected joint and reducing the patient's activity levels.

Researchers have since learned that locking up the joints in this fashion contributes to the worsening of osteoarthritis. In the case of knees, it is important to keep them moving with the proper types of exercise, in order to protect the joints and prevent any further damage caused by arthritis. With this said, all exercise is not created equal for arthritis sufferers, and people with knee osteoarthritis may have certain limitations.(22)

Knee Exercises for Osteoarthritis Patients

High-impact activities should be avoided by a person with knee osteoarthritis. These activities include those where the patient has both feet off the ground at the same time. For this reason, jumping rope and high-impact aerobics are not recommended for arthritis sufferers. The act of running and even jogging are also not recommended.

Many low-impact activities are very beneficial for people with knee osteoarthritis. The three key activities that patients with OA should concentrate on are weight-bearing cardiovascular activity, activities that build muscles, flexibility and range of motion exercises.

Cardiovascular activities that are helpful for patients that are low-impact include cycling, walking and swimming. Swimming is not recommended as highly for weight bearing as the other activities, but it does provide cardiovascular benefits to the heart and improved motion. Swimming is an excellent alternative for patients that experience difficulty and pain when performing other recommended low-impact activities.

An additional benefit to regular exercise is that it helps the patient with OA maintain an ideal and healthy weight, thus decreasing the force sustained by the affected joints.



Works Cited

1. Saint Louis University. Natural toxin implicated as triggering Parkinson's disease
<http://www.sciencedaily.com/releases/2011/02/110210123026.htm>. Accessed June. 4, 2014.
2. Parkinson's disease Foundation. What is Parkinson's disease? <http://www.pdf.org>
3. McCoy, Krisha. Recognizing the Progression of Parkinson's disease Symptoms.
<http://www.everydayhealth.com/parkinsons-disease/parkinsons-disease-progression.aspx>. Accessed June. 5, 2014.
4. McCoy, Krisha. Recognizing the Progression of Parkinson's disease Symptoms.
<http://www.everydayhealth.com/parkinsons-disease/parkinsons-disease-progression.aspx>. Accessed June. 5, 2014.
5. McCoy, Krisha. Recognizing the Progression of Parkinson's disease Symptoms.
<http://www.everydayhealth.com/parkinsons-disease/parkinsons-disease-progression.aspx>. Accessed June. 5, 2014.
6. McLean Hospital. Transplanted fetal stem cells for Parkinson's show promise.
<http://www.sciencedaily.com/releases/2014/06/140605141505.htm>. Accessed June. 6, 2014.
7. Wikipedia. Parkinsonian gait.
http://en.wikipedia.org/wiki/Parkinsonian_gait. Accessed June. 5, 2014.
8. Wikipedia. Parkinsonian gait.
http://en.wikipedia.org/wiki/Parkinsonian_gait. Accessed June. 5, 2014.
9. National Parkinson's Foundation. Getting Around: Canes.
<http://www.parkinson.org/Parkinson-s-Disease/Living-Well/Activities-of-Daily-Living/Getting-Around--Canes>. Accessed June. 6, 2014.
10. <http://www.cdc.gov/obesity/data/facts.html>
11. <http://www.cdc.gov/obesity/adult/defining.html>
12. http://www.cdc.gov/healthyweight/assessing/bmi/adult_bmi/english_bmi_calculator/bmi_calculator.html
13. <http://www.diabeticcareservices.com/diabetes-education/diabetes-and-obesity>
14. American Diabetes Association. Statistics about Diabetes. <http://www.diabetes.org/diabetes-basics/statistics/>
15. National Diabetes Information Clearinghouse (NDIC). Diabetic Neuropathies: The Nerve Damage of Diabetes. <http://diabetes.niddk.nih.gov/dm/pubs/neuropathies/>
16. Kwon, Oh-Yun and Mueller, Michael J. Physical Therapy: Journal of the American Physical Therapy Association. Walking Patterns Used to Reduce Forefoot Plantar Pressures in People With Diabetic Neuropathies. <http://ptjournal.apta.org/content/81/2/828.full> . Accessed May 18, 2014.
17. Neuropathy Support Network. Frequently Asked Questions About Neuropathy
<http://www.neuropathysupportnetwork.org/neuropathy-faq.htm>. Accessed May 19, 2014.
18. Olek MJ. Epidemiology and clinical features of multiple sclerosis in adults. Uptodate.com. Accessed Sept. 19, 2012.

19. WebMD. Reviewed by David T. Derrer, MD on December 29, 2013. Osteoarthritis Health Center/The Basics of Osteoarthritis. <http://www.webmd.com/osteoarthritis/guide/osteoarthritis-basics>.
20. Georgina Kemp, Crossley, Kay M., Wrigley, Tim V., Metcalf, Ben R., and Hinman, Rana S. Arthritis Care and Research. Reducing Joint Loading in Medial Knee Osteoarthritis: Shoes and Canes. Vol. 59, No. 5, May 15, 2008, 609.
21. A Jones, P G Silva, A C Silva, M Colucci, A Tuffanin, J R Jardim, J Natour. Impact of Cane Use on Pain, Function, General Health and Energy Expenditure During Gait in Patients With Knee Osteoarthritis. Ann Rheum Dis. 2012;71(2):172-179. <http://www.medscape.com/viewarticle/756653>.
22. Shaw, Gina. Knee and Hip Exercises for Osteoarthritis. <http://www.webmd.com/osteoarthritis/default.htm>