Introduction: What is pathology?

Massage therapy, as it is generally defined, is the practice of manually manipulating soft body tissues to help the body heal itself to enhance general health and well-being. Indeed, the greatest reward for most therapists is to see a client feel better after a session, to enhance their general health and well-being. Indeed, the greatest reward for most therapists is to see a client feel better after a session, to enhance their general health and well-being. Indeed, the greatest reward for most therapists is to see a client feel better after a session, to enhance their general health and well-being. Indeed, the greatest reward for most therapists is to see a client feel better after a session, to enhance their general health and well-being. Indeed, the greatest reward for most therapists is to see a client feel better after a session, to enhance their general health and well-being. 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What are the different forms?
The specific forms of cerebral palsy are determined by the extent, type, and location of a child’s abnormalities. Doctors classify cerebral palsy according to the type of movement disorder involved – spastic (stiff muscles), athetoid (writhing movements), or ataxic (poor balance and coordination) – plus any additional symptoms. Doctors will often describe the type of cerebral palsy a child has based on which limbs are affected. The names of the most common forms of cerebral palsy use Latin terms to describe the location or number of affected limbs combined with the words for weakened (paresis) or paralyzed (plegia). For example, hemiparesis (hemi = half) indicates that only one side of the body is weakened. Quadruparesis (quad = four) means all four limbs are paralyzed.

- **Spastic hemiplegia/hemiparesis.** This type of cerebral palsy typically affects the arm and hand on one side of the body, but it can also include the leg. Children with spastic hemiplegia generally walk later and on tiptoe because of tight heel tendons. The arm and leg of the affected side are frequently shorter and thinner. Some children will develop an abnormal curvature of the spine (scoliosis). Depending on the location of the brain damage, a child with spastic hemiplegia may also have seizures. Speech will be delayed and, at best, may be competent, but intelligence is usually normal.

- **Spastic diplegia/diparesis.** In this type of cerebral palsy, muscle stiffness is predominantly in the legs and less severely affects the arms and face, although the hands may be clumsy. Tendon reflexes are hyperactive. Toes point up. Tightness in certain leg muscles makes the legs move like the arms of a scissor. Children with this kind of cerebral palsy may require a walker or leg braces. Intelligence and language skills are usually normal.

- **Spastic quadriplegia/quadriparesis.** This is the most severe form of cerebral palsy, often associated with moderate-to-severe mental retardation. It is caused by widespread damage to the brain or significant brain malformations. Children will often have severe stiffness in their limbs but a floppy neck. They are rarely able to walk. Speaking and being understood are difficult. Seizures can be frequent and hard to control.

- **Dyskinetic cerebral palsy (also includes athetoid, choreoathetoid and dystonic cerebral palsies).** Slow and uncontrollable writhing movements of the hands, feet, arms or legs characterize this type of cerebral palsy. In some children, hyperactivity in the muscles of the face and tongue makes them grimace or drool. They find it difficult to sit straight or walk. Children may also have problems coordinating the muscle movements required for speaking. Intelligence is rarely affected in these forms of cerebral palsy.

- **Ataxic cerebral palsy.** This rare type of cerebral palsy affects balance and depth perception. Children will often have poor coordination and walk unsteadily with a wide-based gait, placing their feet unusually far apart. They have difficulty with quick or precise movements, such as writing or buttoning a shirt. They may also have intention tremor, in which a voluntary movement, such as reaching for a book, is accompanied by trembling that gets worse the closer their hand gets to the object.

- **Mixed types.** It is common for children to have symptoms that don’t correspond to any single type of cerebral palsy. Their symptoms are a mix of types. For example, a child with mixed cerebral palsy may have some muscles that are too tight and others that are too relaxed, creating a mix of stiffness and flappiness.

How common is cerebral palsy?
The United Cerebral Palsy (UCP) Foundation estimates that nearly 800,000 children and adults in the United States are living with one or more of the symptoms of cerebral palsy. According to the federal government’s Centers for Disease Control and Prevention (CDC), each year about 10,000 babies born in the United States will develop cerebral palsy.

In a study, CDC used data from the National Health Interview Survey – Child Health Supplement to find the number of children with cerebral palsy in the United States in 1988. The survey asked parents or other adults whether children in the home had cerebral palsy. The study showed that 23 of every 10,000 children 17 years of age or younger had cerebral palsy.

Despite advances in preventing and treating certain causes of cerebral palsy, the percentage of babies who develop the condition has remained the same over the past 30 years. Improved care in neonatal intensive-care units has resulted in higher survival rates for very low birth-weight babies. Many of these infants will have developmental defects in their nervous systems or suffer brain damage that will cause the characteristic symptoms of cerebral palsy.

In the Metropolitan Atlanta Developmental Disabilities Surveillance Program (MADDSP), approximately 2 percent of 8-year-old children had at least one of the five developmental disabilities monitored. MADDSP tracks the number of school-age children living in five counties of metro Atlanta who have cerebral palsy, hearing loss, vision impairment, intellectual disabilities and/or autism spectrum disorders.

In 1996, an estimated 3.6 per 1,000 8-year-old children in metro Atlanta, or about 1 in 278, had cerebral palsy. In 2000, the prevalence was an estimated 3.1 per 1,000, or about 1 in 323, 8-year-olds. In 1996 and 2000, respectively, 55 percent and 60 percent of children with cerebral palsy also had one or more other developmental disabilities tracked by MADDSP.

The CDC also studied how many children in metropolitan Atlanta had cerebral palsy in the mid-1980s. This project was done as part of the Metropolitan Atlanta Developmental Disabilities Study (MADDS), which studied how common certain disabilities were in 10-year-old children. It found that 23 of every 10,000 10-year-old children had cerebral palsy. Eighty-one percent of the children had spastic cerebral palsy. Seventy-five percent had one or more other disabilities (epilepsy, intellectual disabilities, hearing loss or vision impairment).

What causes cerebral palsy?
Doctors use the term cerebral palsy to refer to any one of a number of neurological disorders that appear in infancy or early childhood and permanently affect body movement and muscle coordination but aren’t progressive – in other words, they don’t get worse over time. The term cerebral refers to the two halves or hemispheres of the brain, in this case to the motor area of the brain’s outer layer (called the cerebral cortex), the part of the brain that directs muscle movement; palsy refers to the loss or impairment of motor function.

Even though cerebral palsy affects muscle movement, it isn’t caused by problems in the muscles or nerves. It is caused by abnormalities inside the brain that disrupt the brain’s ability to control movement and posture.

The part of the brain that is damaged determines what parts of the body are affected. There are many possible causes of the brain damage. Some causes affect how the child’s brain develops during the first six months of pregnancy. These causes include genetic
conditions and problems with the blood supply to the brain. Other causes of cerebral palsy happen after the brain has developed. These causes can occur during later pregnancy, delivery or the first years of the child’s life. They include bacterial meningitis and other infections, bleeding in the brain, lack of oxygen, severe jaundice and head injury.

Children who are born prematurely or who are very low birth-weight (less than 1,500 grams or about 3 1/3 pounds) are more likely to have problems that might lead to cerebral palsy. However, children who are full term and normal birth weight can also have cerebral palsy.

A small number of children have acquired cerebral palsy, which means the disorder begins after birth. In these cases, doctors can often pinpoint a specific reason for the problem, such as brain damage in the first few months or years of life, brain infections such as bacterial meningitis or viral encephalitis, or head injury from a motor vehicle accident, a fall or child abuse.

What causes the remaining 90 to 95 percent? Research has given us a bigger and more accurate picture of the kinds of events that can happen during early fetal development or just before, during or after birth, that cause the particular types of brain damage that will result in congenital cerebral palsy. There are multiple reasons why cerebral palsy happens – as the result of genetic abnormalities, maternal infections or fevers, or fetal injury, for example. But in all cases, the disorder is the result of four types of brain damage that cause its characteristic symptoms:

- **Damage to the white matter of the brain (periventricular leukomalacia [PVL]).** The white matter of the brain is responsible for transmitting signals inside the brain and to the rest of the body. PVL describes a type of damage that looks like tiny holes in the white matter of an infant’s brain. These gaps in brain tissue interfere with the normal transmission of signals. There are a number of events that can cause PVL, including maternal or fetal infection. Researchers have also identified a period of selective vulnerability in the developing fetal brain, a period of time between 26 and 34 weeks of gestation, in which periventricular white matter is particularly sensitive to insults and injury.

- **Abnormal development of the brain (cerebral dysgenesis).** Any interruption of the normal process of brain growth during fetal development can cause brain malformations that interfere with the transmission of brain signals. The fetal brain is particularly vulnerable during the first 20 weeks of development. Mutations in the genes that control brain development during this early period can keep the brain from developing normally. Infections, fevers, trauma or other conditions that cause unhealthy conditions in the womb also put an unborn baby’s nervous system at risk.

- **Bleeding in the brain (intracranial hemorrhage).** Intracranial hemorrhage describes bleeding inside the brain caused by blocked or broken blood vessels. A common cause of this kind of damage is fetal stroke. Some babies suffer a stroke while still in the womb because of blood clots in the placenta that block blood flow. Other types of fetal stroke are caused by malformed or weak blood vessels in the brain or by blood-clotting abnormalities. Maternal high blood pressure (hypertension) is a common medical disorder during pregnancy that has been known to cause fetal stroke. Maternal infection, especially pelvic inflammatory disease, has also been shown to increase the risk of fetal stroke.

- **Brain damage caused by a lack of oxygen in the brain (hypoxic-ischemic encephalopathy or intrapartum asphyxia).** Asphyxia, a lack of oxygen in the brain caused by an interruption in breathing or poor oxygen supply, is common in babies due to the stress of labor and delivery. But even though a newborn’s blood is equipped to compensate for short-term low levels of oxygen, if the supply of oxygen is cut off or reduced for lengthy periods, an infant can develop a type of brain damage called hypoxic-ischemic encephalopathy, which destroys tissue in the cerebral motor cortex and other areas of the brain. This kind of damage can also be caused by severe maternal low blood pressure, rupture of the uterus, detachment of the placenta or problems involving the umbilical cord.

What are the risk factors?

Just as there are particular types of brain damage that cause cerebral palsy, there are also certain medical conditions or events that can happen during pregnancy and delivery that will increase a baby’s risk of being born with cerebral palsy. Research scientists have examined thousands of expectant mothers, followed them through childbirth and monitored their children’s early neurological development to establish these risk factors. If a mother or her baby has any of these risk factors, it doesn’t mean that cerebral palsy is inevitable, but it does increase the chance for the kinds of brain damage that cause it.

- **Low birth weight and premature birth.** The risk of cerebral palsy is higher among babies who weigh less than 5 1/2 pounds at birth or are born less than 37 weeks into pregnancy. The risk increases as birth-weight falls or weeks of gestation shorten. Intensive care for premature infants has improved dramatically over the course of the past 30 years. Babies born extremely early are surviving, but with medical problems that can put them at risk for cerebral palsy. Although normal- or heavier-weight babies are at relatively low individual risk for cerebral palsy, term or near-term babies still make up half of the infants born with the condition.

- **Multiple births.** Twins, triplets, and other multiple births – even those born at term – are linked to an increased risk of cerebral palsy. The death of a baby’s twin or triplet further increases the risk.

- **Infections during pregnancy.** Infectious diseases caused by viruses, such as toxoplasmosis, rubella (German measles), cytomegalovirus and herpes, can infect the womb and placenta. Researchers currently think that maternal infection leads to elevated levels of immune system cells called cytokines that circulate in the brain and blood of the fetus. Cytokines respond to infection by triggering inflammation. Inflammation may then go on to cause central nervous system damage in an unborn baby. Maternal fever during pregnancy or delivery can also set off this kind of inflammatory response.

- **Blood type incompatibility.** Rh incompatibility is a condition that develops when a mother’s Rh blood type (either positive or negative) is different from the blood type of her baby. Because blood cells from the baby and mother mix during pregnancy, if a mother is negative and her baby positive, for example, the mother’s system won’t tolerate the presence of Rh-positive red blood cells. Her body will begin to make antibodies that will attack and kill her baby’s blood cells. Rh incompatibility is routinely tested for and treated in the United States, but conditions in other countries continue to keep blood type incompatibility a risk factor for cerebral palsy.

- **Exposure to toxic substances.** Mothers who have been exposed to toxic substances during pregnancy, such as methyl mercury, are at a heightened risk of having a baby with cerebral palsy.

- **Mothers with thyroid abnormalities, mental retardation or seizures.** Mothers with any of these conditions are slightly more likely to have a child with cerebral palsy.
There are also medical conditions during labor and delivery and immediately after delivery that act as warning signs for an increased risk of cerebral palsy. Knowing these warning signs helps doctors keep a close eye on children who face a higher risk. However, parents shouldn’t become too alarmed if their baby has one or more of these conditions at birth. Most of these children will not develop cerebral palsy. Warning signs include:

- **Breech presentation.** Babies with cerebral palsy are more likely to be in a breech position (feet first) instead of head first at the beginning of labor.
- **Complicated labor and delivery.** A baby who has vascular or respiratory problems during labor and delivery may already have suffered brain damage or abnormalities.
- **Small for gestational age.** Babies born smaller than normal for their gestational age are at risk for cerebral palsy because of factors that kept them from growing naturally in the womb.
- **Low Apgar score.** The Apgar score is a numbered rating that reflects a newborn’s condition. To determine an Apgar score, doctors periodically check a baby’s heart rate, breathing, muscle tone, reflexes and skin color during the first minutes after birth. They then assign points; the higher the score, the more normal a baby’s condition. A low score at 10-20 minutes after delivery is often considered an important sign of potential problems such as cerebral palsy.
- **Jaundice.** More than 50 percent of newborns develop jaundice after birth when bilirubin, a substance normally found in bile, builds up faster than their livers can break it down and pass it from the body. Severe, untreated jaundice can cause a neurological condition known as kernicterus, which kills brain cells and can cause deafness and cerebral palsy.
- **Seizures.** An infant who has seizures faces a higher risk of being diagnosed later in childhood with cerebral palsy.

### Can cerebral palsy be prevented?

Cerebral palsy related to genetic abnormalities is not preventable, but a few of the risk factors for congenital cerebral palsy can be managed or avoided. For example, rubella, or German measles, is preventable if women are vaccinated against the disease before becoming pregnant. Rh incompatibilities can also be managed early in pregnancy. But there are still risk factors that can’t be controlled or avoided in spite of medical intervention.

For example, the use of electronic fetal monitoring machines to keep track of an unborn baby’s heartbeat during labor and the use of emergency cesarean section surgery when there are significant signs of fetal distress haven’t lowered the numbers of babies born with cerebral palsy. Interventions to treat other prenatatal causes of cerebral palsy, such as therapies to prevent prenatal stroke or antibiotics to cure intrauterine infections, are either difficult to administer or haven’t yet been proven to lower the risk of cerebral palsy in vulnerable infants.

Fortunately, acquired cerebral palsy, often due to head injury, is preventable using common safety tactics, such as using car seats for infants and toddlers and making sure young children wear helmets when they ride bicycles. In addition, common sense measures around the household, such as supervising babies and young children closely when they bathe, can reduce the risk of accidental injury.

Despite the best efforts of parents and physicians, however, children will still be born with cerebral palsy. Since in many cases the cause or causes of cerebral palsy aren’t fully known, little can currently be done to prevent it. As investigators learn more about the causes of cerebral palsy through basic and clinical research, doctors and parents will know more about how to prevent this disorder.

### Signs and symptoms

The early signs of cerebral palsy usually appear before a child reaches 3 years of age. Parents are often the first to suspect that their baby’s motor skills aren’t developing normally. Infants with cerebral palsy frequently have developmental delay, in which they are slow to reach developmental milestones such as learning to roll over, sit, crawl, smile or walk. Some infants with cerebral palsy have abnormal muscle tone as infants. Decreased muscle tone (hypotonia) can make them appear relaxed, even floppy. Increased muscle tone (hypertonia) can make them seem stiff or rigid. In some cases, an early period of hypotonia will progress to hypertonia after the first 2 to 3 months of life. Children with cerebral palsy may also have unusual posture or favor one side of the body when they move.

Parents who are concerned about their baby’s development for any reason should contact their pediatrician. A doctor can determine the difference between a normal lag in development and a delay that could indicate cerebral palsy.

### What other conditions are associated with cerebral palsy?

Many individuals with cerebral palsy have no additional medical disorders. However, because cerebral palsy involves the brain and the brain controls so many of the body’s functions, cerebral palsy can also cause seizures, impair intellectual development and affect vision, hearing and behavior. Coping with these disabilities may be even more of a challenge than coping with the motor impairments of cerebral palsy.

These additional medical conditions include:

- **Mental retardation.** Two-thirds of individuals with cerebral palsy will be intellectually impaired. Mental impairment is more common among those with spastic quadriplegia than in those with other types of cerebral palsy, and children who have epilepsy and an abnormal electroencephalogram (EEG) or MRI are also more likely to have mental retardation.

- **Seizure disorder.** As many as half of all children with cerebral palsy have seizures. Seizures can take the form of the classic convulsions of tonic-clonic seizures or the less obvious focal (partial) seizures, in which the only symptoms may be muscle twitches or mental confusion.

- **Delayed growth and development.** A syndrome called failure to thrive is common in children with moderate-to-severe cerebral palsy, especially those with spastic quadriaparesis. Failure to thrive is a general term doctors use to describe children who lag behind in growth and development. In babies, this lag usually takes the form of too little weight gain. In young children, it can appear as abnormal shortness, and in teenagers, it may appear as a combination of shortness and lack of sexual development.

In addition, the muscles and limbs affected by cerebral palsy tend to be smaller than normal. This is especially noticeable in children with spastic hemiplegia because limbs on the affected side of the body may not grow as quickly or as long as those on the normal side.

- **Spinal deformities.** Deformities of the spine – curvature (scoliosis), humpback (kyphosis) and saddleback (lordosis) – are associated with cerebral palsy. Spinal deformities can make sitting, standing and walking difficult and cause chronic back pain.

- **Impaired vision, hearing or speech.** A large number of children with cerebral palsy have strabismus, commonly called “cross eyes,” in which the eyes are misaligned because of differences between the left and right eye muscles. In an adult, strabismus causes double vision. In children, the brain adapts to the condition by ignoring signals from one of the misaligned eyes. Untreated, this can lead to poor vision in one eye and can
interfere with the ability to judge distance. In some cases, doctors will recommend surgery to realign the muscles.

- Children with hemiparesis may have hemianopia, which is defective vision or blindness that blurs the normal field of vision in one eye. In homonymous hemianopia, the impairment affects the same part of the visual field in both eyes.
- Impaired hearing is also more frequent among those with cerebral palsy than in the general population. Speech and language disorders, such as difficulty forming words and speaking clearly, are present in more than a third of those with cerebral palsy.
- Drooling. Some individuals with cerebral palsy drool because they have poor control of the muscles of the throat, mouth and tongue. Drooling can cause severe skin irritation. Because it is socially unacceptable, drooling may also isolate children from their peers.
- Incontinence. A common complication of cerebral palsy is incontinence, caused by poor control of the muscles that keep the bladder closed. Incontinence can take the form of bed-wetting, uncontrolled urination during physical activities, or slow leaking of urine throughout the day.
- Abnormal sensations and perceptions. Some children with cerebral palsy have difficulty feeling simple sensations, such as touch. They may have stereognosia, which makes it difficult to perceive and identify objects using only the sense of touch. A child with stereognosia, for example, would have trouble closing his eyes and sensing the difference between a hard ball and a sponge ball placed in his hand.

**Symptoms**
The symptoms of cerebral palsy vary from person to person. Symptoms can also change over time. A person with severe cerebral palsy might not be able to walk and might need lifelong care. Spasticity (rigidity of muscles) may cause impaired motor organization and functioning, including deficits in sitting, standing, locomotion and daily living skills.

A person with mild cerebral palsy, on the other hand, might walk a little awkwardly, but might not need any special help. People with cerebral palsy can have other disabilities as well. Examples of these conditions include seizure disorders, vision impairment, hearing loss and intellectual disabilities.

**How is cerebral palsy managed?**
Cerebral palsy can't be cured, but treatment will often improve a child's capabilities. Many children go on to enjoy near-normal adult lives if their disabilities are properly managed. In general, the earlier treatment begins the better chance children have of overcoming developmental disabilities or learning new ways to accomplish the tasks that challenge them.

There is no standard therapy that works for every individual with cerebral palsy. Once the diagnosis is made and the type of cerebral palsy is determined, a team of health care professionals will work with a child and his or her parents to identify specific impairments and needs, and then develop an appropriate plan to tackle the core disabilities that affect the child's quality of life.

A comprehensive management plan will pull in a combination of health professionals with expertise in the following:

- Physical therapy to improve walking and gait, stretch spastic muscles and prevent deformities.
- Occupational therapy to develop compensating tactics for everyday activities such as dressing, going to school, and participating in day-to-day activities.
- Speech therapy to address swallowing disorders, speech impediments and other obstacles to communication.
- Counseling and behavioral therapy to address emotional and psychological needs and help children cope emotionally with their disabilities.
- Drugs to control seizures, relax muscle spasms and alleviate pain.
- Surgery to correct anatomical abnormalities or release tight muscles.
- Braces and other orthotic devices to compensate for muscle imbalance, improve posture and walking, and increase independent mobility.
- Mechanical aids such as wheelchairs and rolling walkers for individuals who are not independently mobile.
- Communication aids such as computers, voice synthesizers or symbol boards to allow severely impaired individuals to communicate with others.

Doctors use tests and evaluation scales to determine a child's level of disability and then make decisions about the types of treatments and the best timing and strategy for interventions. Early intervention programs typically provide all the required therapies within a single treatment center. Centers also focus on parents' needs, often offering support groups, babysitting services and respite care. The members of the treatment team for a child with cerebral palsy will most likely include the following:

- A physician, such as a pediatrician, pediatric neurologist, or pediatric physiatrist, who is trained to help developmentally disabled children. This doctor, who often acts as the leader of the treatment team, integrates the professional advice of all team members into a comprehensive treatment plan, makes sure the plan is implemented properly, and follows the child's progress over a number of years.
- An orthopedist, a surgeon who specializes in treating the bones, muscles, tendons and other parts of the skeletal system. An orthopedist is often brought in to diagnose and treat muscle problems associated with cerebral palsy.
- A physical therapist, who designs and puts into practice special exercise programs to improve strength and functional mobility.
- An occupational therapist, who teaches the skills necessary for day-to-day living, school and work.
- A speech and language pathologist, who specializes in diagnosing and treating disabilities relating to difficulties with swallowing and communication.
- A social worker, who helps individuals and their families locate community assistance and education programs.
- A psychologist, who helps individuals and their families cope with the special stresses and demands of cerebral palsy. In some cases, psychologists may also oversee therapy to modify unhelpful or destructive behaviors.
- An educator, who may play an especially important role when mental retardation or learning disabilities present a challenge to education.

Regardless of age or the types of therapy that are used, treatment doesn't end when an individual with cerebral palsy leaves the treatment center. Most of the work is done at home. Members of the treatment team often act as coaches, giving parents and children techniques and strategies to practice at home. Studies have shown that family support and personal determination are two of the most important factors in helping individuals with cerebral palsy reach their long-term goals.

While mastering specific skills is an important focus of treatment on a day-to-day basis, the ultimate goal is to help children grow into adulthood with as much independence as possible.
As a child with cerebral palsy grows older, the need for therapy and the kinds of therapies required as well as support services will likely change. Counseling for emotional and psychological challenges may be needed at any age, but is often most critical during adolescence. Depending on their physical and intellectual abilities, adults may need help finding attendants to care for them, a place to live, a job and a way to get to their place of employment.

Addressing the needs of parents and caregivers is also an important component of the treatment plan. The well-being of an individual with cerebral palsy depends upon the strength and well-being of his or her family. For parents to accept a child’s disabilities and come to grips with the extent of their caregiving responsibilities will take time and support from health care professionals. Family-centered programs in hospitals and clinics and community-based organizations usually work together with families to help them make well-informed decisions about the services they need. They also coordinate services to get the most out of treatment.

A good program will encourage the open exchange of information, offer respectful and supportive care, encourage partnerships between parents and the health care professionals they work with, and acknowledge that although medical specialists may be the experts, its parents who know their children best.

What specific treatments are available?

Physical therapy, usually begun in the first few years of life or soon after the diagnosis is made, is a cornerstone of cerebral palsy treatment. Physical therapy programs use specific sets of exercises and activities to work toward two important goals: preventing weakening or deterioration in the muscles that aren’t being used (disuse atrophy), and keeping muscles from becoming fixed in a rigid, abnormal position (contracture).

Resistive exercise programs (also called strength training) and other types of exercise are often used to increase muscle performance, especially in children and adolescents with mild cerebral palsy. Daily bouts of exercise keep muscles that aren’t normally used moving and active and less prone to wasting away. Exercise also reduces the risk of contracture, one of the most common and serious complications of cerebral palsy.

Normally growing children stretch their muscles and tendons as they run, walk and move through their daily activities. This ensures that their muscles grow at the same rate as their bones. But in children with cerebral palsy, spasticity prevents muscles from stretching. As a result, their muscles don’t grow fast enough to keep up with their lengthening bones. The muscle contracture that results can set back the gains in function they’ve made. Physical therapy alone or their lengthening bones. The muscle contracture that results can set back the gains in function they’ve made. Physical therapy alone or their lengthening bones. The muscle contracture that results can set back the gains in function they’ve made. Physical therapy alone or

Occupational therapy. This kind of therapy focuses on optimizing upper body function, improving posture and making the most of a child’s mobility. An occupational therapist helps a child master the basic activities of daily living, such as eating, dressing and using the bathroom alone. Fostering this kind of independence boosts self-reliance and self-esteem and also helps reduce demands on parents and caregivers.

Recreational therapies. Recreational therapies, such as therapeutic horseback riding (also called hippotherapy), are sometimes used with mildly impaired children to improve gross motor skills. Parents of children who participate in recreational therapies usually notice an improvement in their child’s speech, self-esteem and emotional well-being.

Speech and language therapy. About 20 percent of children with cerebral palsy are unable to produce intelligible speech. They also experience challenges in other areas of communication, such as hand gestures and facial expressions, and they have difficulty participating in the basic give-and-take of a normal conversation. These challenges will last throughout their lives.

However, therapists (also known as speech therapists or speech-language pathologists) observe, diagnose, and treat some communication disorders associated with cerebral palsy. They use a program of exercises to teach children how to overcome specific communication difficulties.

For example, if a child has difficulty saying words that begin with “b,” the therapist may suggest daily practice with a list of “b” words, increasing their difficulty as each list is mastered. Other kinds of exercises help children master the social skills involved in communicating by teaching them to keep their head up, maintain eye contact and repeat themselves when they are misunderstood.

Speech therapists can also help children with severe disabilities learn how to use special communication devices, such as a computer with a voice synthesizer or a special board covered with symbols of everyday objects and activities to which a child can point to indicate his or her wishes.

Speech interventions often use a child’s family members and friends to reinforce the lessons learned in a therapeutic setting. This kind of indirect therapy encourages people who are in close daily contact with a child to create opportunities for him or her to use their new skills in conversation.

Treatments for problems with eating and drooling are often necessary when children with cerebral palsy have difficulty eating and drinking because they have little control over the muscles that move their mouth, jaw, and tongue. They are also at risk for breathing food or fluid into the lungs. Some children develop gastroesophageal reflux disease (GERD, commonly called heartburn) in which a weak diaphragm can’t keep stomach acids from spilling into the esophagus. The irritation of the acid can cause bleeding and pain.

Individuals with cerebral palsy are also at risk for malnutrition, recurrent lung infections and progressive lung disease. The individuals most at risk for these problems are those with spastic quadriplegia.

Initially, children should be evaluated for their swallowing ability, which is usually done with a modified barium swallow study. Recommendations regarding diet modifications will be derived from the results of this study.

In severe cases where swallowing problems are causing malnutrition, a doctor may recommend tube feeding, in which a tube delivers food and nutrients down the throat and into the stomach, or gastrostomy, in which a surgical opening allows a tube to be placed directly into the stomach.

Although numerous treatments for drooling have been tested over the years, there is no one treatment that helps reliably. Anticholinergic drugs – such as glycopyrolate – can reduce the flow of saliva but may cause unpleasant side effects, such as dry mouth, constipation and urinary retention. Surgery, while sometimes effective, carries the risk of complications. Some children benefit from biofeedback techniques that help them recognize more quickly when their mouths fall open and they begin to drool. Intranasal devices (devices that fit into the mouth) that encourage better tongue positioning and
swallowing are still being evaluated, but appear to reduce drooling for some children.

**Drug treatments**

Oral medications such as diazepam, baclofen, dantrolene sodium and tizanidine are usually used as the first line of treatment to relax stiff, contracted or overactive muscles. These drugs are easy to use, except that dosages high enough to be effective often have side effects, among them drowsiness, upset stomach, high blood pressure and possible liver damage with long-term use. Oral medications are most appropriate for children who need only mild reduction in muscle tone or who have widespread spasticity.

Doctors also sometimes use alcohol “washes” – injections of alcohol into muscles – to reduce spasticity. The benefits last from a few months to two years or more, but the adverse effects include a significant risk of pain or numbness, and the procedure requires a high degree of skill to target the nerve.

The availability of new and more precise methods to deliver antispasmodic medications is moving treatment for spasticity toward chemodenervation, in which injected drugs are used to target and relax muscles.

**Botulinum toxin (BT-A),** injected locally, has become a standard treatment for overactive muscles in children with spastic movement disorders such as cerebral palsy. BT-A relaxes contracted muscles by keeping nerve cells from over-activating muscles. Although BT-A is not approved by the Food and Drug Administration (FDA) for treating cerebral palsy, since the 1990s doctors have been using it off-label to relax spastic muscles. A number of studies have shown that it reduces spasticity and increases the range of motion of the muscles it targets.

The relaxing effect of a BT-A injection lasts approximately three months. Undesirable side effects are mild and short-lived, consisting of pain upon injection and occasionally mild flu-like symptoms. BT-A injections are most effective when followed by a stretching program including physical therapy and splinting. BT-A injections work best for children who have some control over their motor movements and have a limited number of muscles to treat, none of which is fixed or rigid.

Because BT-A does not have FDA approval to treat spasticity in children, parents and caregivers should make sure that the doctor giving the injection is trained in the procedure and has experience using it in children.

**Intrathecal baclofen** therapy uses an implantable pump to deliver baclofen, a muscle relaxant, into the fluid surrounding the spinal cord. Baclofen works by decreasing the excitability of nerve cells in the spinal cord, which then reduces muscle spasticity throughout the body. Because it is delivered directly into the nervous system, the intrathecal dose of baclofen can be as low as one-hundredth of the oral dose. Studies have shown it reduces spasticity and pain and improves sleep.

The pump is the size of a hockey puck and is implanted in the abdomen. It contains a refillable reservoir connected to an alarm that beeps when the reservoir is low. The pump is programmable with an electronic telemetry wand. The program can be adjusted if muscle tone is worse at certain times of the day or night.

The baclofen pump carries a small but significant risk of serious complications if it fails or is programmed incorrectly, if the catheter becomes twisted or kinked or if the insertion site becomes infected. Undesirable, but infrequent, side effects include overrelaxation of the muscles, sleepiness, headache, nausea, vomiting, dizziness and constipation.

As a muscle-relaxing therapy, the baclofen pump is most appropriate for individuals with chronic, severe stiffness or uncontrolled muscle movement throughout the body. Doctors have successfully implanted the pump in children as young as 3 years of age.

**Surgery**

Orthopedic surgery is often recommended when spasticity and stiffness are severe enough to make walking and moving about difficult or painful. For many people with cerebral palsy, improving the appearance of how they walk – their gait – is also important. A more upright gait with smoother transitions and foot placements is the primary goal for many children and young adults.

In the operating room, surgeons can lengthen muscles and tendons that are proportionately too short. But first, they have to determine the specific muscles responsible for the gait abnormalities. Finding these muscles can be difficult. It takes more than 30 major muscles working at the right time using the right amount of force to walk two strides with a normal gait. A problem with any of those muscles can cause an abnormal gait.

In addition, because the body makes natural adjustments to compensate for muscle imbalances, these adjustments could appear to be the problem, instead of a compensation. In the past, doctors relied on clinical examination, observation of the gait and the measurement of motion and spasticity to determine the muscles involved. Now, doctors have a diagnostic technique known as gait analysis.

Gait analysis uses cameras that record how an individual walks, force plates that detect when and where feet touch the ground, a special recording technique that detects muscle activity (known as electromyography), and a computer program that gathers and analyzes the data to identify the problem muscles. Using gait analysis, doctors can precisely locate which muscles would benefit from surgery and how much improvement in gait can be expected.

The timing of orthopedic surgery has also changed in recent years. Previously, orthopedic surgeons preferred to perform all of the necessary surgeries a child needed at the same time, usually between the ages of 7 and 10. Because of the length of time spent in recovery, which was generally several months, doing them all at once shortened the amount of time a child spent in bed. Now most of the surgical procedures can be done on an outpatient basis or with a short inpatient stay. Children usually return to their normal lifestyle within a week.

Consequently, doctors think it is much better to stagger surgeries and perform them at times appropriate to a child’s age and level of motor development. For example, spasticity in the upper leg muscles (the adductors), which causes a “scissor pattern” walk, is a major obstacle to normal gait. The optimal age to correct this spasticity with adduction release surgery is 2 to 4 years of age. On the other hand, the best time to perform surgery to lengthen the hamstrings or Achilles tendon is 7 to 8 years of age. If adduction release surgery is delayed so that it can be performed at the same time as hamstring lengthening, the child will have learned to compensate for spasticity in the adductors. By the time the hamstring surgery is performed, the child’s abnormal gait pattern could be so ingrained that it might not be easily corrected.

With shorter recovery times and new, less invasive surgical techniques, doctors can schedule surgeries at times that take
advantage of a child’s age and developmental abilities for the best possible result.

Selective dorsal rhizotomy (SDR) is a surgical procedure recommended only for cases of severe spasticity when all of the more conservative treatments – physical therapy, oral medications and intrathecal baclofen – have failed to reduce spasticity or chronic pain. In the procedure, a surgeon locates and selectively severs nerves at the base of the spinal column.

Because it reduces the amount of stimulation that reaches muscles via the nerves, SDR is most commonly used to relax muscles and decrease chronic pain in one or both of the lower or upper limbs. It is also sometimes used to correct an overactive bladder. Potential side effects include sensory loss, numbness or uncomfortable sensations in limb areas once supplied by the severed nerve.

Even though the use of microsurgery techniques has refined the practice of SDR surgery, there is still controversy about how selective SDR actually is. Some doctors have concerns because it is invasive and irreversible and may only achieve small improvements in function. Although recent research has shown that combining SDR with physical therapy reduces spasticity in some children, particularly those with spastic diplegia, whether it improves gait or function has still not been proven. Ongoing research continues to look at this surgery’s effectiveness.

Spinal cord stimulation was developed in the 1980s to treat spinal cord injury and other neurological conditions involving motor neurons. An implanted electrode selectively stimulates nerves at the base of the spinal cord to inhibit and decrease nerve activity. The effectiveness of spinal cord stimulation for the treatment of cerebral palsy has yet to be proven in clinical studies. It is considered a treatment alternative only when other conservative or surgical treatments have been unsuccessful at relaxing muscles or relieving pain.

Orthotic devices
Orthotic devices – such as braces and splints – use external force to correct muscle abnormalities. The technology of orthotics has advanced over the past 30 years from metal rods that hooked up to bulky orthopedic shoes, to appliances that are individually molded from high-temperature plastics for a precise fit. Ankle-foot orthoses are frequently prescribed for children with spastic diplegia to prevent muscle contracture and to improve gait. Splints are also used to correct spasticity in the hand muscles.

Assistive technology
Devices that help individuals move about more easily and communicate successfully at home, at school, or in the workplace can help a child or adult with cerebral palsy overcome physical and communication limitations. There are a number of devices that help individuals stand straight and walk, such as postural support or seating systems, open-front walkers, quadripedal canes (lightweight metal canes with four feet), and gait poles. Electric wheelchairs let more severely impaired adults and children move about successfully.

The computer is probably the most dramatic example of a communication device that can make a big difference in the lives of people with cerebral palsy. Equipped with a computer and voice synthesizer, a child or adult with cerebral palsy can communicate successfully with others. For example, a child who is unable to speak or write but can make head movements may be able to control a computer using a special light pointer that attaches to a headband.

A person with severe cerebral palsy may be unable to speak clearly. The massage therapist and the client need to devise an unspoken code that allows them to communicate. Ideas include blinking the eyes once for “yes” and closing them for no; or using hand signals, such as one finger for “yes” and two for “no.” Other signals could be agreed upon to indicate discomfort or other conditions.

Massage and cerebral palsy
People with cerebral palsy, including children, can derive many benefits from massage that is handled correctly. A 2004 study of children with cerebral palsy in early intervention programs conducted by the Easter Seal Society and the United Cerebral Palsy Foundation found symptoms in children decreased following massage therapy [Hernandez-Reif et al.].

The researchers said after 12 weeks of twice-weekly massage therapy sessions (added to their standard care, which included physical therapy), very young children with CP showed reduced spasticity and less overall arm hypertonic (rigid) muscle tone. They noted the reduction in spasticity was very important because spastic tone disorder – a major factor for many with CP – leads to increased muscle tone or rigidity, decreased range of motion and formation of contractures and limited movement. In addition, children who received massage therapy in the study had improved range of motion scores for hip extension.

The volunteer licensed massage therapists in the study followed a strict protocol, addressing the head, face and scalp; shoulders, arms and hands; chest, hips, legs and feet; and back of each child. Techniques included stroking, light circular massage, kneading, flexing wrist and fingers, rolling and stroking arms; small fingers circles and other fingertip techniques; moving the child’s knee toward his chest without forcing joints to work the hips; and circle strokes on the back.

Considerations
Massage therapists should assess a client’s condition to determine the severity of his or her condition and modify massage treatments appropriately, regardless of age. Comfort for the client is important; cushions or alternate positions, such as seated or on the side, should be considered. Massage also can be performed in a wheelchair.

A therapist must remember that the condition is caused by problems in the brain; the contractures and tightening of connective tissue around muscles are symptoms of that problem. To reach the goal of improving muscle tone, a therapist must look beyond a client’s limbs. Many bodyworkers find craniorectal work, with gentle rocking, slow range-of-motion exercises and manipulation of arms and legs, works best. But therapists may have to experiment with different approaches to find the right moves to help clients with cerebral palsy and ensure they find the massage relaxing and enjoyable.

Massage for these people is geared to palliative care, making light gliding strokes and gentle kneading most effective in creating a relaxing experience for the client. Passive stretching and joint mobilizations should be omitted or used only with caution because the bone integrity of patients whose mobility is impaired often is also compromised. A massage for a person with CP should never hurt.

PART II: FIBROMYALGIA
About fibromyalgia
Fibromyalgia syndrome is a common and chronic disorder characterized by widespread pain, diffuse tenderness, and a number of other symptoms. The word “fibromyalgia” comes from the Latin
term for fibrous tissue (fibro) and the Greek ones for muscle (myo) and pain (algia).

Although fibromyalgia is often considered an arthritis-related condition, it is not truly a form of arthritis (a disease of the joints) because it does not cause inflammation or damage to the joints, muscles, or other tissues. Like arthritis, however, fibromyalgia can cause significant pain and fatigue, and it can interfere with a person’s ability to carry on daily activities. Also like arthritis, fibromyalgia is considered a rheumatic condition, a medical condition that impairs the joints and/or soft tissues and causes chronic pain.

In addition to pain and fatigue, people who have fibromyalgia may experience a variety of other symptoms including:

- Cognitive and memory problems (sometimes referred to as “fibro fog”).
- Sleep disturbances.
- Morning stiffness.
- Headaches.
- Irritable bowel syndrome.
- Painful menstrual periods.
- Numbness or tingling of the extremities.
- Restless legs syndrome.
- Temperature sensitivity.
- Sensitivity to loud noises or bright lights.

Fibromyalgia is a syndrome rather than a disease. A syndrome is a collection of signs, symptoms and medical problems that tend to occur together but are not related to a specific, identifiable cause. A disease, on the other hand, has a specific cause or causes and recognizable signs and symptoms.

**How common is fibromyalgia?**

Scientists estimate that fibromyalgia affects 5 million Americans age 18 or older. For unknown reasons, between 80 and 90 percent of those diagnosed with fibromyalgia are women; however, men and children also can be affected. Most people are diagnosed during middle age, although the symptoms often become present earlier in life.

People with certain rheumatic diseases, such as rheumatoid arthritis, systemic lupus erythematosus (commonly called lupus) or ankylosing spondylitis (spinal arthritis) may be more likely to have fibromyalgia, too.

Several studies indicate that women who have a family member with fibromyalgia are more likely to have fibromyalgia themselves, but the exact reason for this – whether it is heredity, shared environmental factors, or both – is unknown. One current study supported by the National Institute of Arthritis and Musculoskeletal and Skin Diseases (NIAMS) is trying to determine whether variations in certain genes cause some people to be more sensitive to stimuli that lead to pain syndromes.

**What causes fibromyalgia?**

The causes of fibromyalgia are unknown, but there are probably a number of factors involved. Many people associate the development of fibromyalgia with a physically or emotionally stressful or traumatic event, such as an automobile accident. Some connect it to repetitive injuries. Others link it to an illness. For others, fibromyalgia seems to occur spontaneously.

Many researchers are examining other causes, including problems with how the central nervous system (the brain and spinal cord) processes pain.

Some scientists speculate that a person’s genes may regulate the way his or her body processes painful stimuli. According to this theory, people with fibromyalgia may have a gene or genes that cause them to react strongly to stimuli that most people would not perceive as painful. There have already been several genes identified that occur more commonly in fibromyalgia patients, and researchers are currently looking at other possibilities.

**How is fibromyalgia diagnosed?**

Research shows that people with fibromyalgia typically see many doctors before receiving the diagnosis. One reason for this may be that pain and fatigue, the main symptoms of fibromyalgia, overlap with those of many other conditions. Therefore, doctors often have to rule out other potential causes of these symptoms before making a diagnosis of fibromyalgia. Another reason is that there are currently no diagnostic laboratory tests for fibromyalgia; standard laboratory tests fail to reveal a physiologic reason for pain. Because there is no generally accepted, objective test for fibromyalgia, some doctors unfortunately may conclude a patient’s pain is not real, or they may tell the patient there is little they can do.

A doctor familiar with fibromyalgia, however, can make a diagnosis based on criteria established by the American College of Rheumatology (ACR): a history of widespread pain lasting more than three months, and the presence of diffuse tenderness. Pain is considered to be widespread when it affects all four quadrants of the body, meaning it must be felt on both the left and right sides of the body as well as above and below the waist. ACR also has designated 18 sites on the body as possible tender points. To meet the strict criteria for a fibromyalgia diagnosis, a person must have 11 or more tender points, but often patients with fibromyalgia will not always be this tender, especially men. People who have fibromyalgia certainly may feel pain at other sites, too, but those 18 standard possible sites on the body are the criteria used for classification.

Figure 1 shows the location of the nine paired tender points that make up the 1990 American College of Rheumatology criteria for fibromyalgia. The anatomical locations of tender points associated with fibromyalgia include:

- **Back side of the body:** The occiput, suboccipital muscle insertions; trapezius, midpoint of the upper border; supraspinatus, above the medial border of the scapular spine; glutal, upper outer quadrants of buttocks; and great trochanter, posterior to the trochanteric prominence.

![Figure 1: Tender points on the body used to diagnose fibromyalgia](image)

**Front side of the body:** Low cervical, anterior aspect of...
the intertransverse spaces at C5-C7; second rib, second costochondral junctions; lateral epicondyle, 2 cm distal to the epicondyles; and knee, medial fat pad proximal to the joint line.

Risk factors
Causes and risk factors are unknown, but some things have been loosely associated with disease onset, according to the Centers for Disease Control. These include:
- Stressful or traumatic events, such as car accidents, post-traumatic stress disorder (PTSD).
- Repetitive injuries.
- Illness, such as viral infections.
- Certain diseases, such as rheumatoid arthritis and chronic fatigue syndrome.
- Genetic predisposition.

How is fibromyalgia treated?
Fibromyalgia can be difficult to treat. Not all doctors are familiar with fibromyalgia and its treatment, so it is important to find a doctor who is. Many family physicians, general internists or rheumatologists (doctors who specialize in arthritis and other conditions that affect the joints or soft tissues) can treat fibromyalgia.

Fibromyalgia treatment often requires a team approach, with a doctor, physical therapist, possibly other health professionals, and most importantly, the patient, all playing an active role. It can be hard to assemble this team, and it may be a struggle to find the right professionals to treat the patient. However, the combined expertise of these various professionals can help people improve their quality of life.

A good place to find members of such as treatment team is a clinic. There are pain clinics that specialize in pain and rheumatology clinics that specialize in arthritis and other rheumatic diseases, including fibromyalgia.

Only three medications, duloxetine (Cymbalta1), milnacipran (Savella), and pregabalin (Lyrica) are approved by the U.S. Food and Drug Administration (FDA) for the treatment of fibromyalgia. Cymbalta was originally developed for and is still used to treat depression. Savella is similar to a drug used to treat depression, but is FDA approved only for fibromyalgia. Lyrica is a medication developed to treat neuropathic pain (chronic pain caused by damage to the nervous system).

Following are some of the most commonly used categories of drugs for fibromyalgia.

- **Analgesics**
  Analgesics are painkillers. They range from over-the-counter acetaminophen (Tylenol) to prescription medicines, such as tramadol (Ultram), and even stronger narcotic preparations. For a subset of people with fibromyalgia, narcotic medications are prescribed for severe muscle pain. However, there is no solid evidence showing that for most people narcotics actually work to treat the chronic pain of fibromyalgia, and most doctors hesitate to prescribe them for long-term use because of the potential that the person taking them will become physically or psychologically dependent on them.

- **Nonsteroidal anti-inflammatory drugs (NSAIDs)**
  As their name implies, nonsteroidal anti-inflammatory drugs, including aspirin, ibuprofen (Advil, Motrin) and naproxen sodium (Anaprox, Aleve), are used to treat inflammation. Although inflammation is not a symptom of fibromyalgia, NSAIDs also relieve pain. The drugs work by inhibiting substances in the body called prostaglandins, which play a role in pain and inflammation. These medications, some of which are available without a prescription, may help ease the muscle aches of fibromyalgia. They may also relieve menstrual cramps and the headaches often associated with fibromyalgia.

- **Antidepressants**
  Perhaps the most useful medications for fibromyalgia are several in the antidepressant class. These drugs work equally well in fibromyalgia patients with and without depression, because antidepressants elevate the levels of certain chemicals in the brain (including serotonin and norepinephrine) that are associated not only with depression, but also with pain and fatigue. Increasing the levels of these chemicals can reduce pain in people who have fibromyalgia. Doctors prescribe several types of antidepressants for people with fibromyalgia, described below.

- **Tricyclic antidepressants.** When taken at bedtime in dosages lower than those used to treat depression, tricyclic antidepressants can help promote restorative sleep in people with fibromyalgia. They also can relax painful muscles and heighten the effects of the body’s natural pain-killing substances called endorphins. Tricyclic antidepressants have been around for almost half a century. Some examples of tricyclic medications used to treat fibromyalgia include amitriptyline hydrochloride (Elavil, Endep), cyclobenzaprine (Cycloflex, Flexeril, and Flexiban), doxepin (Adapin, Sinequan) and nortriptyline (Aventyl, Pamelor). Both amitriptyline and cyclobenzaprine have been proven useful for the treatment of fibromyalgia.

- **Selective serotonin reuptake inhibitors.** If a tricyclic antidepressant fails to bring relief, doctors sometimes prescribe a newer type of antidepressant called a selective serotonin reuptake inhibitor (SSRI). As with tricyclics, doctors usually prescribe these for people with fibromyalgia in lower dosages than are used to treat depression. By promoting the release of serotonin, these drugs may reduce fatigue and some other symptoms associated with fibromyalgia. The group of SSRIs includes fluoxetine (Prozac), paroxetine (Paxil) and sertraline (Zoloft). Newer SSRIs such as citalopram (Celexa) or escitalopram (Lexapro) do not seem to work as well for pain as the older SSRIs.

- **SSRIs may be prescribed along with a tricyclic antidepressant.** Studies have shown that a combination therapy of the tricyclic amitriptyline and the SSRI fluoxetine resulted in greater improvements in the study participants' fibromyalgia symptoms than either drug alone.

- **Mixed reuptake inhibitors.** Some newer antidepressants raise levels of both serotonin and norepinephrine and are therefore called mixed reuptake inhibitors. Examples of these medications include venlafaxine (Effexor), duloxetine (Cymbalta) and (Savella). In general, these drugs work better for pain than SSRIs, probably because they also raise norepinephrine, which may play an even greater role in pain transmission than serotonin.

- **Benzodiazepines**
  Benzodiazepines can sometimes help people with fibromyalgia by relaxing tense, painful muscles and stabilizing the erratic brain waves that can interfere with deep sleep. Benzodiazepines also can relieve the symptoms of restless legs syndrome, a neurological disorder that is more common among people with fibromyalgia. The disorder is characterized by unpleasant sensations in the legs and an uncontrollable urge to move the legs, particularly when at rest, in an effort to relieve these feelings. Doctors usually prescribe benzodiazepines only for people who have not responded to other therapies because of the
potential for addiction. Benzodiazepines include clonazepam (Klonopin) and diazepam (Valium).

Other medications

In addition to the previously described general categories of drugs, doctors may recommend or prescribe others, depending on a person’s specific symptoms or fibromyalgia-related conditions. For example, for people with irritable bowel syndrome (IBS), doctors may suggest fiber supplements or laxatives to relieve constipation or medications such as diphenoxylate/atropine (Lotomil) or loperamide (Imodium) for diarrhea. A prescription medication called alosetron (Lotronex) is approved for the treatment of severe IBS with diarrhea that does not respond to other treatment. Another drug, lubiprostone (Amitiza), is approved for the treatment of IBS with constipation.

Antispasmodic medications may be useful for relieving intestinal spasms and reducing abdominal pain. Other symptom-specific medications include sleep medications, muscle relaxants, and headache remedies.

People with fibromyalgia also may benefit from a combination of physical and occupational therapy, from learning pain management and coping techniques, and from properly balancing rest and activity.

Complementary and alternative therapies

Many people with fibromyalgia also report varying degrees of success with complementary and alternative therapies, including massage, movement therapies (such as Pilates and the Feldenkrais method), chiropractic treatments, acupuncture and various herbs and dietary supplements for different fibromyalgia symptoms.

Although some of these supplements are being studied for fibromyalgia, there is little, if any, scientific proof yet that they help. FDA does not regulate the sale of dietary supplements, so information about side effects, proper dosage and the amount of a preparation’s active ingredient may not be well known. People who are using or would like to try a complementary or alternative therapy should first speak with their doctors, who may know more about the therapy’s effectiveness as well as whether it is safe to try in combination with current medications.

Will fibromyalgia get better with time?

Fibromyalgia is a chronic condition, meaning it lasts a long time – possibly a lifetime. However, it may be comforting to know that fibromyalgia is not a progressive disease. It is never fatal, and it will not cause damage to the joints, muscles or internal organs. In many people, the condition does improve over time.

Other ways to improve quality of life

Besides taking prescription medicine, there are many things people can do to minimize the impact of fibromyalgia on their lives. These include:

- Getting enough sleep. Getting enough sleep and the right kind of sleep can help ease the pain and fatigue of fibromyalgia. Even so, many people with fibromyalgia have problems such as pain, restless legs syndrome or brainwave irregularities that interfere with restful sleep. It is important to discuss any sleep problems with the doctor, who can prescribe or recommend treatment for them.

- Exercising. Although pain and fatigue may make exercise and daily activities difficult, it is crucial to be as physically active as possible. Research has repeatedly shown that regular exercise is one of the most effective treatments for fibromyalgia. People who have too much pain or fatigue to do vigorous exercise should begin with walking or other gentle exercise and build their endurance and intensity slowly.

- Making changes at work. Most people with fibromyalgia continue to work, but they may have to make big changes to do so. For example, some people cut down the number of hours they work, switch to a less demanding job, or adapt a current job. The employer of a person who face obstacles at work, such as an uncomfortable desk chair that leaves his or her back aching or who has difficulty lifting heavy boxes or files, may make adaptations that will enable the person to keep the job. And sometimes it is just a case of asking for the accommodation. An occupational therapist can help a person design a more comfortable workstation or find more efficient and less painful ways to lift.

- People who are unable to work at all because of a medical condition may qualify for disability benefits through their employer or the federal government. Social Security Disability Insurance (SSDI) and Supplemental Security Insurance (SSI) are the largest federal programs providing financial assistance to people with disabilities. Although the medical requirements for eligibility are the same under the two programs, the way they are funded is different. SSDI is paid by Social Security taxes, and those who qualify for assistance receive benefits based on how much they have paid into the system. SSI is funded by general tax revenues, and those who qualify receive payments based on financial need. For information about the SSDI and SSI programs, contact the Social Security Administration.

Eating well

Although some people with fibromyalgia report feeling better when they eat or avoid certain foods, no specific diet has been proven to influence fibromyalgia. Of course, it is important to have a healthy, balanced diet. Not only will proper nutrition give people more energy and make them generally feel better, it will also help them avoid other health problems.

Tips for good sleep for your client – or yourself

- Keep regular sleep habits. Try to get to bed at the same time and get up at the same time every day – even on weekends and vacations.

- Avoid caffeine and alcohol in the late afternoon and evening. If consumed too close to bedtime, the caffeine in coffee, soft drinks, chocolate and some medications can keep you from sleeping or sleeping soundly. Even though it can make you feel sleepy, drinking alcohol around bedtime also can disturb sleep.

- Time your exercise. Regular daytime exercise can improve nighttime sleep. But avoid exercising within three hours of bedtime, which actually can be stimulating, keeping you awake.

- Avoid daytime naps. Sleeping in the afternoon can interfere with nighttime sleep. If you feel you cannot get by without a nap, set an alarm for one hour. When it goes off, get up and start moving.

- Reserve your bed for sleeping. Watching the late news, reading a suspense novel or working on your laptop in bed can stimulate you, making it hard to sleep.

- Keep your bedroom dark, quiet and cool.

- Avoid liquids and spicy meals before bed. Heartburn and late-night trips to the bathroom are not conducive to good sleep.

- Wind down before bed. Avoid working right up to bedtime. Do relaxing activities, such as listening to soft music or taking a warm bath, that get you ready to sleep. (A warm bath also may soothe aching muscles.)

What are researchers learning about fibromyalgia?

A number of government studies have been approved to learn more about fibromyalgia. Following are descriptions of some of the
promising research now being conducted:

- **Understanding pain.** Research suggests that fibromyalgia is caused by a problem in how the body processes pain, or more precisely, a hypersensitivity to stimuli that normally are not painful. Therefore, several National Institutes of Health-supported researchers are focusing on ways the body processes pain to better understand why people with fibromyalgia have increased pain sensitivity. These studies include:
  - An investigation into the relationship between variations in a gene called ADRA1A and risk factors for chronic pain conditions.
  - The establishment of a tissue bank of brain and spinal cord tissue to study fibromyalgia and to determine the extent to which chronic pain in fibromyalgia patients is associated with the activation of cells in the nervous system and the production of chemical messengers, called cytokines, that promote inflammation.
  - The use of imaging methods to evaluate the status of central nervous system responses in patients diagnosed with fibromyalgia compared to those diagnosed with another chronic pain disorder and pain-free controls.
  - An investigation to understand how the activation of immune cells from peripheral and central nervous system sources trigger a cascade of events leading to the activation of nerve cells, chronic pain, and the dysregulation of the effects of analgesic drugs against pain.
  - An intensive evaluation of twins in which one of the pair has chronic widespread pain and the other does not, along with twins in which neither of the pair has chronic pain, to help researchers assess physiological similarities and differences in those with and without chronic pain and whether those differences are caused by genetics or environment.
  - A study examining the use of cognitive behavioral therapy in pain patients, which researchers hope will advance their knowledge of the role of psychological factors in chronic pain as well as a new treatment option for fibromyalgia.

- **The Patient-Reported Outcomes Measurement Information System (PROMIS) initiative.** The PROMIS initiative is researching and developing new ways to measure patient-reported outcomes (PROs), such as pain, fatigue, physical functioning, emotional distress and social role participation that have a major impact on quality of life across a variety of chronic diseases. The goal of this initiative is to improve the reporting and quantification of changes in patient-reported outcomes. NIAMS supports an effort to develop PROMIS specifically for use in patients with fibromyalgia.

- **Improving symptoms.** A better understanding of fibromyalgia and the mechanisms involved in chronic pain are enabling researchers to find effective treatments for it. Some of the most promising lines of research in this area include the following:
  - **Increasing exercise.** Although fibromyalgia is often associated with fatigue that makes exercise difficult, regular exercise has been shown to be one of the most beneficial treatments for the condition. A new study is trying to determine whether increasing lifestyle physical activity (that is, adding more exercise such as walking up stairs instead of taking the elevator) throughout the day produces similar benefits to exercise for fibromyalgia, improving symptoms such as pain, fatigue and tenderness. The study is also examining the potential mechanisms by which lifestyle physical activity might influence symptoms. Other research is examining the effectiveness of a 16-week program of a simplified form of tai chi on pain and other measures such as sleep quality, fatigue, anxiety and depression.
  - Research is also examining ways to help people maintain helpful exercise programs. Because many people with fibromyalgia associate increased exercise with increased pain, doctors and therapists often have a difficult time getting patients to stick with their exercise program. The new research is examining patients’ fears that cause them to avoid exercise as well as behavioral therapies to reduce fears and help them maintain exercise.
  - **Improving sleep.** Researchers supported by NIAMS are investigating ways to improve sleep for people with fibromyalgia whose sleep problems persist despite treatment with medications. One team has observed that fibromyalgia patients with persistent sleep problems share characteristics with people who have sleep-disordered breathing, a group of disorders, the most common of which is the obstructive sleep apnea, characterized by pauses in breathing during sleep. These researchers are studying whether continuous positive airway pressure (CPAP, a therapy administered by a machine that increases air pressure in the throat to hold it open during sleep) might improve the symptoms of fibromyalgia.
  - Other groups of researchers are examining the link between sleep disturbance and chronic pain in fibromyalgia and are studying whether behavioral therapy for insomnia might improve fibromyalgia symptoms.

**Massage considerations**

Ruth Werner, president of the Massage Therapy Foundation, a massage therapist, author of the influential textbook for therapists “A Massage Therapist’s guide to Pathology” and others, says: “The most important message about massage for fibromyalgia is that patients have good days and bad days. Their tolerance for depth, speed and pressure in massage can vary greatly day to day; the therapist must always stay within individual pain tolerance.”

The body of research on massage therapy and fibromyalgia is not large. However, a number of studies support that relaxation control massage can improve sleep patterns and decrease pain, fatigue, anxiety, depression and even cortisol levels in adults with fibromyalgia.

Experts generally encourage gentle massage, with slow progression only when appropriate to a specific client. Trigger point massage may help with tender points, but aggressive, deep pressure should not be used. Lymph drainage therapy can also be helpful to a client – but only with very light movements. Other modalities are indicated, but only with caution and within the client’s tolerance. Any use of ice or ice massage is contraindicated.

**PART III: MYOFASCIAL PAIN SYNDROME**

**About myofascial pain syndrome**

A disorder that shares many qualities of fibromyalgia is myofascial pain syndrome (MPS). It is a painful disorder that can affect any skeletal muscles and produce acute or chronic musculoskeletal pain. The pain centers around sensitive points in the muscle called trigger points, which may be felt as taut bands of muscle. It may be local or referred pain, and include tightness, tenderness, stiffness and limited movement, twitching and muscle weakness.

Many of the trigger points correspond to acupuncture points used to treat pain, and many types of pain, including headaches, jaw pain, neck pain, low back pain, pelvic pain and arm and leg pain, have been linked to trigger points.
While trigger points don’t actually hurt and it difficult to get comfortable or sleep. Simple moving while sleeping can activate a trigger point.

Other unique symptoms include:

- **Referred pain.** In addition to the area of the affected muscle, there is pain from the trigger point elsewhere on the body.
- **Regional pain:** Trigger points usually flare up in specific regions, often around the neck and shoulders. Jaw muscles often develop trigger points, causing pain all over the face and head.
- **Pain patterns.** The areas of skeletal muscles that are likely to develop trigger points have been mapped, as have the patterns of referred pain.

Reduced range of motion and feelings of muscle weakness are common, as well as tingling and stiffness. Sleep problems also may be present.

**How is myofascial pain syndrome diagnosed?**

There are no specific tests or criteria for diagnosing MPS. Nearly everyone has trigger points, often latent and not actively causing pain, and that, too, complicates diagnosis. However, physicians looking for the source of pain normally know to look for the trigger points, the biggest clue to diagnosing the syndrome.

A physician will perform a thorough history and examination, including a review of symptoms. The doctor will examine areas of pain, including range of motion and strength testing. The physician may feel for trigger points by applying gentle finger pressure to the painful area to find tense areas, and monitor a patient’s reaction. He or she may apply pressure on or around the trigger points looking for the telltale twitch.

Lab tests may be ordered to look for medical causes of muscle pain, such as vitamin D deficiency or hypothyroidism.

**Complications**

If they are not already present, myofascial pain syndrome can lead to other issues over time. These include:

- **Muscle weakness:** While trigger points don’t actually hurt muscles, the pain and a patient’s tendency to avoid using the affected muscle can lead to muscle weakness over time. Other unaffected muscles also can be stressed when the muscle affected by myofascial pain does not function properly.
- **Sleep issues:** Patients enduring myofascial pain syndrome often find it difficult to get comfortable or sleep. Simple moving while sleeping can activate a trigger point.
- **Fibromyalgia:** The two syndromes often co-exist in people. Some experts believe people with fibromyalgia are more

### Signs and symptoms

The key symptom of myofascial pain is the presence of the trigger points that respond to touch and create a twitch response leading to pain. The trigger points are bands or nodules that are taut, hypertonic bands of fibers within a mass of muscle that is less tight. Palpitating the tissue can produce a muscle flicker, or twitch response.

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- **Fibromyalgia:** The two syndromes often co-exist in people. Some experts believe people with fibromyalgia are more
sensitive to pain signals. Whether that sensitivity connects the two syndromes is an area still to be explored.

**Can myofascial pain be prevented?**
There are no specific regimens to prevent myofascial pain. However, the general rules for maintaining a healthy body may at a minimum reduce the severity of MPS:
- Focus on and improve posture.
- Maintain a healthy weight; reduce if overweight.
- Exercise regularly.
- Eat a healthy, well-balanced diet.
- Learn stress-management techniques.
- Learn about issues such as repetitive motion problems and the proper precautions to take, at work and during exercise and sports.

**Prognosis**
Myofascial pain syndrome is a chronic pain disorder that is not fatal. But without treatment, it can significantly reduce the quality of life for sufferers. The pain, however, can be minimized with treatment.

**Treatments**
Dealing with trigger points is the ultimate goal of myofascial pain treatments. Desensitizing them to alleviate pain can be addressed a number of ways. These include trigger-point injections, physical therapy, acupuncture, local anesthetics or numbing solutions, vapor-coolant spray and local moist heat applications; and massage with manual pressure to help stretch affected muscles.

**Trigger point injections**
During a trigger point injection, the doctor inserts a needle with an anesthetic into and around a trigger point, a procedure called “needling.” Dry needling is sometimes performed with no injected medications. These can relieve the pain around the trigger point.

**Steroids**
Steroids may be used in areas where inflammation is confirmed or suspected. Botulinum toxin (Botox) may be used to block acetylcholine release at the neuromuscular junction.

**Topical anesthetics**
At least one study found the a topical anesthetic patch helped reduce myofascial pain without the discomfort of an injection. The study found those who received the patch had fewer subjective symptoms and increased pain thresholds.

**Physical therapy**
A physical therapist will design a plan based on a patient’s symptoms. These may include:
- **Stretching:** Gentle stretching exercises with the affected muscle may help ease pain. Numbing solutions may also be used during the exercise.
- **Identifying pain factors:** If poor posture, for example, causes muscle stress in a person’s back, a physical therapist can provide exercises to correct the posture. Workplace issues, such as muscle overuse and ergonomics also may addressed.
- **Massage** also may be a key part of the PT plan. (See below).

**Acupuncture**
Based on traditional Chinese medicine, during an acupuncture session, a practitioner places thin needles at specific points in the body. This process is believed to adjust and alter the body’s energy flow into healthier patterns, and is used to treat a wide variety of illnesses and health conditions, including myofascial pain.

A report from a Consensus Development Conference on Acupuncture held at the National Institutes of Health (NIH) in 1997 stated that acupuncture is being “widely” practiced – by thousands of physicians, dentists, acupuncturists and other practitioners – for relief or prevention of pain and for various other health conditions. According to the 2007 National Health Interview Survey, which included a comprehensive survey of complementary and alternative medicine by Americans, an estimated 3.1 million U.S. adults and 150,000 children had used acupuncture in the previous year. Between the 2002 and 2007 NHIS, acupuncture use among adults increased by three-tenths of 1 percent (approximately 1 million people).

**Medications**
Numbing medications or corticosteroid medications may be used during needling. Other medications treat the signs and symptoms of myofascial pain syndrome, including:
- **Nonsteroidal anti-inflammatory drugs (NSAIDs).** These drugs, sold over-the-counter, include ibuprofen (Advil, Motrin and others) and naproxen (Aleve). Prescription NSAIDs also may be dispensed.
- **Depression medications:** A class of medications for depression, tricyclic antidepressants, may be used for pain. Amitriptyline (Elavil) often is used for this pain.

**Massage considerations**
Therapists should discuss the areas of pain with a client and massage those and adjacent areas. Therapeutic massage can help loosen tight muscles and relieve any cramping are spasms. Long hand strokes along the muscle or specific pressure on specific areas may release tension. Moist heat may be used to soften fascia before bodywork begins. Deep gliding, kneading and deep-friction movements are all indicated with client tolerance. Slow, gradual pressure may work best.

Massage also can help clean up the debris that results when muscle cells can’t exchange nutrients for metabolic waste.

Avoid oscillating movements such as percussion and vibration because these movements may cause localized contractions. Therapists must be mindful of a patient’s pain and tolerance levels at all times.

**PART IV: CHRONIC FATIGUE SYNDROME**

**About chronic fatigue syndrome: The mystery disease**
Chronic fatigue syndrome, or CFS, is a devastating and complex disorder characterized by overwhelming fatigue that is not improved by bed rest and that may be worsened by physical or mental activity. People with CFS most often function at a significantly lower level of activity than they were capable of before the onset of illness.

In addition to these key defining characteristics, patients report various nonspecific symptoms, including weakness, muscle pain, impaired memory and/or mental concentration, insomnia and post-exertional fatigue lasting more than 24 hours. In some cases, CFS can persist for years.

Some experts have suggested that chronic fatigue syndrome and fibromyalgia syndrome are two names for the same condition, with CFS the early form of fibromyalgia. However, one key difference seems to be that persons with chronic fatigue experience more fatigue and persons with fibromyalgia experience more pain.

No specific diagnostic tests are available for CFS. Moreover, since many illnesses have incapacitating fatigue as a symptom, care must be taken to exclude other known and often treatable conditions before a diagnosis of CFS is made.

Because of the limited knowledge about this mysterious condition, a patient must satisfy two criteria to be diagnosed with chronic fatigue
syndrome:
1. Have severe chronic fatigue for at least six months or longer that is not relieved by rest and not due to medical or psychiatric conditions associated with fatigue as excluded by clinical diagnosis.
2. Concurrently have four or more of the following symptoms:
   - Self-reported impairment in short-term memory or concentration severe enough to cause substantial reduction in previous levels of occupational, educational, social, or personal activities.
   - Sore throat that’s frequent or recurring.
   - Tender cervical or axillary lymph nodes.
   - Muscle pain.
   - Multi-joint pain without swelling or redness.
   - Headaches of a new type, pattern or severity.
   - Unrefreshing sleep.
   - Post-exertional malaise (extreme, prolonged exhaustion and sickness following physical or mental activity) lasting more than 24 hours.

The fatigue and impaired memory or concentration must have impaired normal daily activities, along with other symptoms that must have persisted or recurred during six or more consecutive months of illness and must not have predated the fatigue.

Other commonly observed symptoms in CFS
- Abdominal pain.
- Alcohol intolerance.
- bloating.
- Chest pain.
- Chronic cough.
- Diarrhea.
- Dizziness.
- Dry eyes or mouth.
- Earaches.
- Irregular heartbeat.
- Jaw pain.
- Morning stiffness.
- Nausea.
- Night sweats
- Psychological problems (depression, irritability, anxiety, panic attacks).
- Shortness of breath.
- Skin sensations, such as tingling.
- Weight loss.

These symptoms do not contribute to the diagnosis of CFS.

How common is CFS – diagnostic challenges
Diagnosing chronic fatigue syndrome (CFS) can be complicated by a number of factors:
1. There’s no diagnostic laboratory test or biomarker for CFS.
2. Fatigue and other symptoms of CFS are common to many illnesses.
3. CFS is an invisible illness and many patients don’t look sick.
4. The illness has a pattern of remission and relapse.
5. Symptoms vary from person to person in type, number and severity.

These factors have contributed to an alarmingly low diagnosis rate.

Causes of CFS
The cause or causes of CFS remain unknown, despite a vigorous search and debate. While a single cause for CFS may yet be identified, another possibility is that CFS represents a common endpoint of disease resulting from multiple sudden causes. Some of the possible causes of CFS might be due to infectious agents, immunological dysfunction, stress activating the hypothalamic-pituitary-adrenal (HPA) axis, neurally mediated hypotension, and/or nutritional deficiency.

As such, it should not be assumed that any of the possible causes listed below has been formally excluded, or that these largely unrelated possible causes are contradictory. Conditions that have been proposed to trigger the development of CFS include virus infection or other traumatic conditions, stress, and toxins.

Infectious agents
Due in part to its similarity to acute or chronic infections, CFS was initially thought to be caused by a virus (i.e., Epstein-Barr (EBV) mononucleosis). However, a CDC four-city surveillance study found no association between CFS and infection by a wide variety of human pathogens, including EBV, human retroviruses, human herpesvirus 6, enteroviruses, rubella, Candida albicans, and more recently, bornaviruses and Mycoplasma. Taken together, the CDC says these studies suggest that among identified human pathogens, there appears to be no one pathogen that causes CFS.

However, in mid-2010, the medical-scientific community was abuzz with a new report that supported a 2009 study in which scientists identified a murine leukemia virus (MLV)-related virus called XMRV in blood samples from patients with documented CFS. The findings were discounted when other researchers subsequently were unable to find MLF-related virus gene sequences in CFS patients.

So, in 2010, a U.S. Food and Drug Administration researcher decided to test frozen samples of blood taken from well-documented CFS patients about 20 years ago. In collaboration with the National Institutes of Health, the new team searched for MLF-related viruses in both patients and healthy donors. In August 2010, the team reported the researchers had found MLF-like virus gene sequences in 32 of 37 (86.5 percent) of the CFS patients, compared with 3 of 44 (6.8 percent) of healthy donors.

Dr. Harvey J. Alter at the NIH’s Clinical Center emphasized that the new findings do not prove causality for the virus, but do provide more support for the earlier study. His team is continuing to test the theory. The issue has attracted much attention because of its potentially far-reaching implications. Alter’s group is currently screening blood donors for evidence of transmission to recipients. If these viruses do cause CFS, protecting the nation’s blood supply will be a top priority.

However, the possibility remains that CFS may have multiple causes leading to a common endpoint, in which case some viruses or other infectious agents might have a contributing role for a subset of CFS cases. Recently published research suggests that infection with Epstein-Barr virus, Ross River virus and Coxiella burnetii will lead to a post-infective condition that meets the criteria for CFS in approximately 12 percent of cases. The severity of the acute illness was the only factor found to predict which individuals would have persistent symptoms characteristic of CFS at the six-month and one-year period following infection.

Immunology
It has been proposed that CFS may be caused by an immunologic dysfunction, for example inappropriate production of cytokines, such as interleukin-1, or altered capacity of certain immune functions. As of today, one thing is certain: there are no immune disorders in CFS patients on the scale traditionally associated with disease.
Some investigators have observed anti-self antibodies and immune complexes in many CFS patients, both of which are hallmarks of autoimmune disease. However, no associated tissue damage typical of autoimmune disease has been described in patients with CFS. The opportunistic infections or increased risk for cancer observed in persons with immunodeficiency diseases or in immunosuppressed individuals is also not observed in CFS. Several investigators have reported lower numbers of natural killer cells or decreased natural killer cell activity among CFS patients compared with healthy controls, but others have found no differences between patients and controls.

T-cell activation markers have also been reported to have differential expression in groups of CFS patients compared with controls, but again, not all investigators have consistently observed these differences.

One intriguing hypothesis is that various triggering events, such as stress or a viral infection, may lead to the chronic production of cytokines and then to CFS. Administration of some cytokines in therapeutic doses is known to cause fatigue, but no characteristic pattern of chronic cytokine secretion has ever been identified in CFS patients.

Finally, several studies have shown that CFS patients are more likely to have a history of allergies than are healthy controls. Allergy could be one predisposing factor for CFS, but it cannot be the only one, because not all CFS patients have it. Many patients do report intolerances for certain substances that may be found in foods or over-the-counter medications and products such as alcohol or the artificial sweetener aspartame.

**Hypothalamic-pituitary adrenal (HPA) axis**

Multiple laboratory studies have suggested that the central nervous system may have an important role in CFS. Physical or emotional stress, which is commonly reported as a pre-onset condition in CFS patients, alters the activity of the hypothalamic-pituitary-adrenal axis, or HPA axis, leading to altered release of corticotrophin-releasing hormone (CRH), cortisol and other hormones. CRH influences the immune system and many other body systems. It may also affect several aspects of behavior.

Recent studies revealed that CFS patients often produce lower levels of cortisol than do healthy controls. Similar hormonal abnormalities have been observed by others in CFS patients and in persons with related disorders like fibromyalgia. Cortisol suppresses inflammation and cellular immune activation, and reduced levels might relax constraints on inflammatory processes and immune cell activation. As with the immunologic data, the altered cortisol levels noted in CFS cases fall within the accepted range of normal, and only the average between cases and controls allows the distinction to be made. Therefore, cortisol levels (under normal conditions) cannot be used as a diagnostic marker for an individual with CFS.

A placebo-controlled trial in which 70 CFS patients were randomized to receive either just enough hydrocortisone each day to restore their cortisol levels to normal or placebo pills for 12 weeks concluded that low levels of cortisol itself are not directly responsible for symptoms of CFS, and that hormonal replacement is not an effective treatment. However, additional research into other aspects of neuroendocrine correlates of CFS is necessary to fully define this important, and largely unexplored, field.

**Neurally mediated hypotension**

Other studies have been conducted to determine whether disturbances in the autonomic regulation of blood pressure and pulse (neurally mediated hypotension, or NMH) were common in CFS patients. The investigators were alerted to this possibility when they noticed an overlap between their patients with CFS and those who had neurally mediated hypotension. NMH can be induced by using tilt table testing, which involves laying the patient horizontally on a table and then tilting the table upright to 70 degrees for 45 minutes while monitoring blood pressure and heart rate. Persons with NMH will develop lower blood pressure under these conditions, as well as other characteristic symptoms, such as lightheadedness, visual dimming or a slow response to verbal stimuli. Many CFS patients experience lightheadedness or worsened fatigue when they stand for prolonged periods or when in warm places, such as in a hot shower. These conditions are also known to trigger NMH.

Neurally mediated hypotension and postural tachycardia syndromes share some of the symptoms of CFS. They should be considered if symptoms are common with changes in position, after eating, unusual amounts of or inadequate fluid intake, or increases in activity. Current evidence does not support these conditions as being universally present in patients with CFS.

**Nutritional deficiency**

There is no published scientific evidence that CFS is caused by a nutritional deficiency. While evidence is currently lacking for nutritional defects in CFS patients, it should also be added that a balanced diet can be favorable to better health in general and would be expected to have beneficial effects in any chronic illness.

**Risk factors**

- Women are diagnosed with chronic fatigue syndrome at least four times as often as men.
- The condition is most common in people in their 40s and 50s, but it can affect people of all ages.

**Complications**

Many of the possible complications with CFS are related to lifestyle. They include:

- Depression because of a lack of diagnosis as well as symptoms.
- Side effects from medication.
- Adverse effects from lack of activity.
- Social isolation.
- Missing work or losing a job.

**Symptoms of CFS**

Chronic fatigue syndrome can be misdiagnosed or overlooked because its symptoms are common to other many disorders. Fatigue, for instance, is found in hundreds of illnesses. The nature of the symptoms, however, can help distinguish CFS from other illnesses.

**Primary symptom**

As the name *chronic fatigue syndrome* suggests, this illness is accompanied by fatigue. However, it’s not the kind of fatigue we experience after a particularly busy day or week, after a sleepless night or after a single stressful event. It’s a severe, incapacitating fatigue that results in a dramatic decline in both activity level and stamina. The illness results in a substantial reduction in occupational (work-related), personal, social or educational activities.

**Other symptoms**

Many CFS patients may experience other symptoms, including:

- Irritable bowel.
- Depression or psychological problems (irritability, mood swings, anxiety, panic attacks).
- Chills and night sweats.
- Visual disturbances (blurring, sensitivity to light, eye pain).
- Allergies or sensitivities to foods, odors, chemicals, medications...
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1. There’s no diagnostic laboratory test or biomarker for CFS.
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3. CFS is an invisible illness and many patients don’t look sick.
4. The illness has a pattern of remission and relapse.
5. Symptoms vary from person to person in type, number, and severity.

These factors have contributed to an alarmingly low diagnosis rate. Of the 4 million Americans who are estimated to have CFS, less than 20 percent have been diagnosed.

Testing for CFS

Because there is no blood test, brain scan or other lab test to diagnose CFS, it’s a diagnosis of exclusion. If a patient meets the diagnostic criteria outlined above, a health care professional will first take a detailed patient history, including a review of medications that could be causing the fatigue. A thorough physical and mental status examination will also be performed. Next, a battery of laboratory screening tests will be ordered to help identify or rule out other possible causes of symptoms. The physician may also order additional tests to follow up on results of the initial screening tests. A diagnosis of insufficient fatigue could be made if a patient has been fatigued for six months or more but does not meet the symptom criteria for CFS.

It can be difficult for a person to talk to a physician or other health care professional about the possibility that they may have chronic fatigue syndrome. A variety of health care professionals, including physicians, nurse practitioners and physician assistants, can diagnose CFS and help develop an individualized treatment plan for a person.

Self-diagnosis

Chronic fatigue syndrome can resemble many other illnesses, including mononucleosis, Lyme disease, lupus, multiple sclerosis, fibromyalgia, primary sleep disorders, severe obesity and major depressive disorders. Medications can also cause side effects that mimic the symptoms of CFS.

Because CFS can resemble many other disorders, it’s important not to self-diagnose CFS. It’s not uncommon for people to mistakenly assume they have chronic fatigue syndrome when they have another illness that needs to be treated.

It’s also important not to delay seeking a diagnosis and medical care. CDC research suggests that early diagnosis and treatment of CFS can increase the likelihood of improvement.

Treatment for CFS

Managing chronic fatigue syndrome can be as complex as the illness itself. There is no cure, no prescription drugs have been developed specifically for CFS, and symptoms vary considerably over time. These factors complicate the treatment process and require patients and health care professionals to constantly monitor and frequently revise treatment strategies.

One key to managing CFS is working with health care professionals to create an individualized treatment program. This program should be based on a combination of therapies, for example traditional and alternative, which address symptoms, activity management and coping techniques.

Identification of a CFS patient’s greatest problem is most important because the illness affects people differently. Relief of symptoms is the primary treatment goal. Expecting a CFS patient to feel “normal” (for example, a return to usual activities) should not be the immediate goal because trying to reach that goal may aggravate the illness. CFS is a complicated illness and therefore may require input from a variety of medical professionals. Primary care providers can develop effective treatment plans based on their experience in treating other illnesses.

Coping with CFS

Living with chronic fatigue syndrome can be difficult. Like other debilitating chronic illnesses, CFS can have a devastating impact on daily life, requiring patients to make significant lifestyle changes and adapt to a series of new limitations.

Common difficulties

Common difficulties for CFS patients include problems coping with:

- The changing and unpredictable symptoms.
- A decrease in stamina that interferes with daily living activities.
- Memory and concentration problems that seriously affect work or school performance.
- Loss of independence, livelihood and economic security.
- Alterations in relationships with family and friends.
- Worries about raising children.
- Concerns about the potential impact of decreased sexual activity on intimate relationships.

Feelings of anger, guilt, anxiety, isolation and abandonment are common in CFS patients. While it’s normal to have such feelings, unresolved emotions and stress can make symptoms worse, interfere with pharmacological therapies and make recovery harder.
There are many different types of treatment and management tools available for chronic fatigue syndrome. These include:

- Professional counseling.
- Cognitive behavioral therapy (CBT).
- Graded exercise therapy (GET).
- Symptomatic treatment.
- Alternative therapies.
- Support groups.
- Pharmacologic therapy.
- Sleep hygiene.
- Pain therapy.
- Orthostatic instability treatment.
- Antidepressants.

Professional counseling
Consulting a trained professional will help most patients build effective coping skills. A supportive counselor can help develop coping skills to lessen the anxiety, depression, grief, anger and guilt that often accompany chronic illness. A therapist, using problem-solving techniques and standard psychotherapy and counseling methods, can help work through these issues. In some cases, a therapist may recommend a combination of medication and psychotherapy.

Sometimes chronic illnesses like CFS affect the entire family, not just the patient. Consulting a behavioral health professional may be helpful to address changes in family dynamics related to living with CFS.

Cognitive behavioral therapy (CBT)
Cognitive therapy seeks to help the patient overcome difficulties by identifying and changing dysfunctional thinking, behavior and emotional responses. This involves helping patients develop skills for modifying beliefs, identifying distorted thinking, relating to others in different ways, and changing behaviors.

Cognitive behavioral therapy, or CBT, is often prescribed to help chronically ill patients cope with illness and develop behaviors and strategies that help improve symptoms. It has been successful in helping patients with cardiovascular disease, diabetes and cancer, and recent studies indicate that CBT can be useful in treating some CFS patients. CBT can help patients understand their limitations, pace themselves appropriately, and avoid push-and-crash cycles.

Clinicians may want to refer some CFS patients to behavioral health professionals to help them problem-solve and develop specific techniques for conducting activities of daily living that have become difficult. Referral to a neuropsychologist, neurologist or psychiatrist for evaluation and testing may be necessary to determine whether other underlying conditions may be involved. It should be noted that training to improve cognition is a highly specialized therapy and requires input of trained behavioral health clinicians.

CBT is frequently prescribed as part of the therapeutic process; it helps patients learn to manage activity levels, stress and symptoms. CBT can help chronic fatigue patients better adapt to the impact of their condition and improve their level of function and quality of life.

Graded exercise therapy (GET)
Graded exercise therapy (GET) is physical activity that starts very slowly and gradually increases over time. Some people with CFS avoid all activity because personal experience has demonstrated a link between exertion and symptom severity. An even greater number of people engage in an endless “push-crash” cycle in which they do too much, crash, rest, start to feel a little better and do too much once again, perpetuating the cycle. Exercise, however is a normal and required bodily function; studies have shown that even healthy people who do not exercise do not feel well. When beginning an exercise program, it is important to avoid the push-pull cycle and instead balance physical activity.

A GET program that includes active stretching followed by range-of-motion contractions and extensions is usually an effective start. Five minutes per day is a typical starting point for an individual who has been totally inactive. When beginning a GET program, it is important to avoid extremes and instead balance physical activity and rest. Research has shown that gradual, guided physical activity can help persons with CFS. Appropriate rest is an important element of GET and patients must learn to stop activity before illness and fatigue are worsened.

The end point of each GET session should be preset by the clock or number of repetitions, and these endpoints should be reached before the patient becomes tired. Each patient will have to determine her individual limits by trial and error; limits on time or repetition assist in this goal. At this stage in the understanding of the illness, prevention of tiredness and reactivation of the prevention of activation of the syndrome and an increase in overall fitness are appropriate goals. GET may be summarized by the adage that no exercise is bad, some is good, but too much is not helpful.

Symptomatic treatment
People with CFS display different patterns of primary symptoms. Symptom severity can also vary considerably. Clinicians and patients should communicate with one another about which symptoms are most disruptive or disabling and tailor the management plan accordingly. Treatment can be directed toward the most problematic symptoms as prioritized by the patient, but only after underlying conditions applicable to those symptoms have been investigated and excluded.

Primary symptoms may include sleep problems, muscle and joint pain, cognitive dysfunction, fatigue, headaches and sore throat. Gastrointestinal complaints, orthostatic instability (relating to standing upright), depression and allergies are also seen in many patients. Aggressive symptom management for these and other disruptive symptoms is indicated.

Memory and concentration complaints are two of the more distressing symptoms reported by people with CFS. Relaxation and meditation training and memory aids, such as organizers, schedulers and written resource manuals, can be helpful in addressing cognitive problems. Stimulating the mind with puzzles, word games, card games and other activities may also be beneficial for some patients.

Health care professionals should use caution in prescribing stimulants for cognitive problems. Mild stimulants may be helpful for some patients, but stronger stimulants can lead to the “push-crash” cycle (do too much, crash, rest, start to feel a little better, do too much once again, and so on) and cause relapse.

Alternative therapies
Deep breathing and muscle relaxation techniques, massage and healing touch, and movement therapies like stretching, yoga and tai chi can be beneficial for some CFS patients in reducing anxiety and promoting a sense of well-being.

Patients should discuss all potential alternative therapies with health care professionals.
Support groups
Many people with CFS find it therapeutic to meet with other people who have this illness. Support groups can provide patients with useful, current information, and they can provide a sense of community with people who understand what you’re going through. Some patients do not have the energy to physically join a support group but can benefit by participating via teleconference (recent study reported at the IACFS/ME conference).

Support groups are not appropriate for everyone, and some CFS patients may find that a support group actually adds to their stress rather than relieving it. Most support groups are free, collect voluntary donations, or charge modest membership dues to cover basic expenses (e.g. refreshments at meetings or photocopying costs).

A useful support group should include:
- Both newcomers and patients who have had CFS for longer periods of time to provide a balance of perspectives for the group.
- People with whom the CFS patient feels comfortable.
- Leaders who empathize, gently draw out shy members and keep others from dominating, and who distill discussion into useful information.
- A history indicating the group is stable and meeting the needs of its members.

Some support groups may put their own interests before those of the individual patient. Groups that engage in any of the following activities should be avoided:
- Promise sure cures and quick solutions.
- Conduct meetings that are mainly “gripe” sessions.
- Urge patients to stop prescribed treatment and recommend a single solution to their problem.
- Insist that patients reveal private or sensitive information.
- Demand allegiance to a cult-like, charismatic leader.
- Charge high fees.
- Require patients to purchase products.

Pharmacologic therapy
Pharmacologic therapy is directed toward the relief of specific symptoms experienced by the individual patient. There are many over-the-counter (OTC) and prescription drug therapies that can be used to treat sleep difficulties, cognitive problems, pain and other symptoms of CFS.

Many CFS patients are sensitive to medications, particularly sedating medications. Therapeutic benefits can often be achieved at lower than normal dosages, so health care professionals should try prescribing a fraction of the usual recommended dose to start and gradually increase as necessary and as tolerated. All medications can cause side effects, which may lead to new symptoms or worsen existing symptoms, so it is important to routinely monitor all prescription drugs, OTC therapies and supplements.

Some drugs act on multiple body systems and symptoms. For instance, tricyclic antidepressants may not only improve mood, but may help with sleep and pain. Prescribing such drugs allows the use of fewer medications to address multiple symptoms with minimal side effects.

Nutritional and herbal supplements
Nutritional supplements and vitamins are frequently used by people with CFS for symptom relief. There have been few clinical trials on nutritional supplements and vitamins; these products are unregulated, and information on potency and side effects is frequently unknown. However, many CFS patients report symptom relief with use.

Therefore, health care professional and patients need to talk about supplement use and OTC products to determine safety, effectiveness and possible negative interactions with prescribed medications and therapies.

CFS patients should be advised to avoid herbal remedies like:
- Comfrey.
- Germander.
- Licorice root.
- Ephedra.
- Chaparral.
- Yohimbe.
- Kava.
- Bitter orange.
- Any other supplements that are potentially dangerous.

Nutritional supplements can’t take the place of good diet and nutrition, so a well-balanced diet is encouraged. Some people with CFS report sensitivities to various foods or chemicals, including refined sugar, caffeine, alcohol and tobacco.

Sleep hygiene
The majority of CFS patients experience some form of sleep dysfunction. Common sleep complaints include difficulty falling asleep, hypersomnia (extreme sleepiness), frequent awakening, intense and vivid dreaming, restless legs and nocturnal myoclonus (night-time muscular spasm). Most CFS patients experience non-restorative sleep as compared to their pre-illness experience.

Health professionals can help people with CFS adopt good sleep habits. Patients should be advised to practice standard sleep hygiene techniques:
- Establish a regular bedtime routine.
- Avoid napping during the day.
- Incorporate an extended wind-down period.
- Use the bed only for sleep and sex.
- Schedule regular sleep and wake times.
- Control noise, light and temperature.
- Avoid caffeine, alcohol and tobacco.
- Light exercise and stretching earlier in the day, at least four hours before bedtime, may also improve sleep.

When sleep hygiene is not successful, the use of pharmaceutical drugs may be indicated. Initial medications to consider are simple antihistamines or over-the-counter sleep products. If this is not beneficial, health care professionals are encouraged to start with a prescription sleep medicine in the smallest possible dose and briefest period possible.

Unrefreshing sleep can be present even though medications may help patients achieve required hours of sleep. A sleep specialist should evaluate patients whose sleep remains non-restorative following standard interventions.

Primary sleep disorders such as sleep apnea (brief pause in breathing during sleep) and narcolepsy (uncontrollable sleeping) exclude the diagnosis of CFS, and most people with such disorders respond to therapy. It is very important for health care professionals to get a careful sleep history.

Pain therapy
CFS pain occurs both in muscles, myalgia, (sometimes described as “deep pain”) and joints (arthralgias). Patients may also complain
of headaches (typically pressure-like) and allodynia, which is generalized hyperalgesia or soreness of the skin to touch.

Most pain therapy begins with simple analgesics (pain-relievers) like acetaminophen, aspirin or non-steroid anti-inflammatory drugs (NSAIDS). Additional therapy can be managed by a pain specialist. Counseling for pain management techniques is advisable for patients with this kind of constant pain.

Pain management should include nonpharmacological treatments and alternative therapies. Stretching and movement therapies, gentle massage, heat, toning exercises, hydrotherapy (water therapy for healing) and relaxation techniques can be helpful for CFS care. Acupuncture, when administered by a qualified practitioner who is knowledgeable about CFS, may be effective for pain management in some patients.

**Orthostatic instability treatment**

Some patients with CFS may also exhibit symptoms of orthostatic instability (relating to standing upright), in particular frequent dizziness and light-headedness. Depending on severity and clinical judgment, these patients should be referred for evaluation by a cardiologist or neurologist. Specific treatment for orthostatic instability should only be started following confirmed diagnosis and by clinicians experienced in evaluating therapeutic results and managing possible complications.

Treatments for orthostatic problems include volume expansion for CFS patients who do not have heart or blood vessel disease. If symptoms do not improve with increased fluid and salt intake, prescription medications and support stockings can be prescribed.

**Antidepressants**

Research shows that CFS is not a form of psychiatric illness or depression. However, many people with chronic illnesses, including those with CFS, may suffer from secondary depression as the patient makes the multiple adjustments to having a devastating, chronic illness.

As many as half of CFS patients develop depression sometime during the course of the illness. When it’s present, depression needs to be treated. Although treating depression can reduce anxiety and stress, it is not a cure for CFS.

Professionals are advised to use caution in prescribing antidepressants. Antidepressant drugs of various classes have other effects that may act on other CFS symptoms and/or cause side effects.

There are brief psychiatric screening tools available that can be given and scored in the primary care setting, such as the Beck Depression Inventory. Results of these screening tools that point to a possible underlying depression or other psychological disorder require a referral to a mental health professional.

**For other problems**

- Medications such as aspirin, acetaminophen (Tylenol and others) and nonsteroidal anti-inflammatory drugs (NSAIDS) such as ibuprofen (Advil, Motrin and others) may be prescribed for pain.
- Antihistamines and decongestants may relieve allergy-like symptoms.
- Medications may be available to treat symptoms such as dizziness, skin tenderness and anxiety.

**Alternative therapies**

Studies suggest that acupuncture may decrease fatigue, pain, anxiety and other symptoms of CFS. Other complementary therapies include:

- Deep-breathing and muscle-relaxation techniques.

**Massage and healing touch.**

**Movement therapies such as stretching, yoga and tai chi.**

**Massage considerations**

Gentle massage can help a client with CFS as it soothes the nervous system, relieves muscle and joint pain and can improve sleep. Massage also will stimulate the parasympathetic response, cleanse tissue and stimulate circulation for a client who cannot handle exercise.

Because a person’s symptoms can vary from day to day, the therapist must ask the client at each session about current symptoms and adjust the massage accordingly. If the client is feeling overly fatigued, the treatment time should be reduced; lighter-than-normal pressure is appropriate.

Therapists should always be ready to assist clients who feel dizzy or light-headed after treatment.

**Bibliography**

**Introduction**

- The 2005 National Health Interview Survey, Centers for Disease Control.

**Part I: Central Pain**


**Part II: Fibromyalgia**

- Fibromyalgia and CAM. National Center for Complementary and Alternative Medicine.
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**Part III: Myofascial Pain Syndrome**


**Part IV: Chronic Fatigue Syndrome**

1. Pathology is defined as:
   a. The normal and complete anatomy and physiology of a healthy person.
   b. The study of the essential nature of diseases and the changes produced by them.
   c. A study to complete a psychological profile of a person who is physically and mentally ill.
   d. Another term for autopsy.

2. Children with spastic hemiplegia/hemiparesis:
   a. Are affected on both sides of the body.
   b. Frequently have a shorter, thinner arm and leg on the unaffected side.
   c. Suffer from the most severe form of cerebral palsy.
   d. Often have delayed speech, but normal intelligence.

3. Massage for people with cerebral palsy can always include:
   a. Deep tissue massage with maximum pressure.
   b. Passive stretching.
   c. Joint mobilizations.
   d. Light gliding strokes and gentle kneading.

4. Fibromyalgia is:
   a. An infection.
   b. A syndrome.
   c. A specific disease of the brain.
   d. An aneurysm.

5. Diagnostic criteria for fibromyalgia includes all of the following, EXCEPT:
   a. A psychiatric exam.
   b. A history of widespread pain lasting for at least three months.
   c. Pain affecting all four quadrants of the body.
   d. At least 11 of 18 “tender points” affected.

6. Which of the following drugs is considered most useful for treating fibromyalgia?
   a. Narcotics.
   b. NSAIDs.
   c. Antidepressants.
   d. Benzodiazepines.

7. A person with myofascial pain syndrome experiences pain that centers around sensitive points called:
   a. Tender areas.
   b. Trigger points.
   c. Pressure points.
   d. Key points.

8. Which of the following is not a therapeutic technique or massage that can help loosen tight muscles and relieve cramps for people with myofascial pain syndrome?
   a. Long hand strokes.
   b. Moist heat.
   c. Deep kneading movements.
   d. Oscillating movements.

9. A key difference between chronic fatigue syndrome and fibromyalgia is that people who suffer with fibromyalgia:
   a. Tend to get less sleep.
   b. Experience more fatigue.
   c. Have severe abdominal swelling.
   d. Experience more pain.

10. Which of the following is not a factor in diagnosing chronic fatigue syndrome (CFS)?
    a. The illness has a pattern of remission and relapse.
    b. There’s no diagnostic laboratory test or biomarker.
    c. The patient has a pale, chalky appearance.
    d. Symptoms vary from person to person.