A Study of Hydrotherapy and Its Health Benefits

Mozhdeh Bahadorfar
M.A in Physical education, India

Abstract

This study has an overview of hydrotherapy and its benefits. At first, the author reviewed the definition of hydrotherapy and its history then she illustrated the benefits of it in hot and cold water and also some popular methods used today to deliver hydrotherapy and its benefits to the body. Then the author studied about hydrotherapy exercises for the osteoarthritis (OA) of the knee in comparison with land-based exercises. At the end of the study, the author interviewed with the participants and found that the water-based group had more reduction in pain than the land-based group.

Keywords:

Hydrotherapy, Health Benefits, History of Hydrotherapy, osteoarthritis, Thermal Hydrotherapy, Cold Water Hydrotherapy

1. Introduction

1.1 Definition of Hydrotherapy

Hydrotherapy is derived from the Greek word “Hydro” meaning water, and “Therapia” meaning healing. It means water healing. It is controlled aquatic exercise in heated sanitized water. Any treatment in water. Hydrotherapy is the medicinal use of water for positive health benefits. These health benefits come from the mechanical and thermal effects of water interacting with the body. It includes the use of physical water properties, specifically temperature and pressure, and sometimes the delivery of minerals or herbal treatments to manipulate the body’s flow of blood, the endocrine system and associated neural systems in order to treat the symptoms of certain diseases.

1.2. History of Hydrotherapy

The oldest recorded use of Hydrotherapy can be traced back to ancient Egypt, where royalty bathed in large, warm pools of water mixed with oils and flowers. Whether or not people embarked upon this activity to enjoy health benefits or merely as an indulgent luxury is not certain, but given the advanced nature of the culture at the time, many believe that the Egyptians understood the inherent medicinal value of water as a healing agent. Other experts believe that Hydrotherapy got its start even earlier in Asia. In India, Japan and China, natural hot springs rich in minerals were often used to cleanse the body and soul of its impurities, and how far back that practice reached is hard to estimate.

During the reign of the Greek empire, minerals were added to warm baths to help alleviate symptoms of common maladies and sickness. The Romans borrowed from these practices and expanded upon them, becoming famous for the large communal bathhouses they built for the enjoyment and health of their citizens.

After the fall of Rome and during the Middle Ages, the practice of Hydrotherapy seemed to disappear, but it was "rediscovered" and popularized in Europe during the Victorian Era, particularly in the 18th and 19th centuries.

The father of modern Hydrotherapy is believed by many to be Vincent Priessnitz, an Austrian farmer born in the 1700's who prescribed combinations of "water, food & air" in place of traditional medicine as cures for common ailments. Word of his treatments and their successes traveled quickly, and because they were cheap and easy to do at home, they became very popular in Europe during his lifetime. Later, A Bavarian Priest named Sebastian Kneipp furthered Priessnitz's work and developed systematic and controlled applications of Hydrotherapy for support and in combination with medicinal treatments delivered by doctors. It was the first time in modern history where Hydrotherapy was used as a medicinal treatment and administered by health professionals.

Most early forms of Hydrotherapy in Europe involved the use of cold water, particularly in the treatment of diseases that led to high fevers, as cold water was instrumental in bringing about relief from otherwise harmful high body temperatures. But there were some hot treatments that become popular at the time, as well. Borrowed from "Turkish Baths", hot Hydrotherapy treatment was introduced by David Urquhart into England after he returned from a trip to the East where he had enjoyed the beneficial therapeutic effects of hot mineral baths.

Hydrotherapy came to the United States from Europe in the mid-19th century. The first medicinal Hydrotherapy clinic was thought to have opened in 1844 in New York City and later moved to Massachusetts. It wasn't long before similar operations opened in other cities, as the use of Hydrotherapy and specifically hot and cold baths became a vogue practice, particularly among the wealthy elite.

Hydrotherapy spawned a tourism trade, where different locations became renowned for their adeptness at curing different ailments. People would travel to different locations seeking cures for various maladies, and would also travel to different locations depending on the time of the year.

For example, many English citizens would travel to locations with hot springs in the winter, and to locations with cold springs in the summer.

In the 1940's, the use of "whirlpools" – or whirling water movement produced by jets of water powered by mechanical pumps – was introduced and Hydrotherapy took a giant leap forward. With the addition of pressure and water movement, the health benefits of Hydrotherapy were increased and concurrently, the medical community scientifically documented some of the positive changes Hydrotherapy initiates in our bodies.

Now popularly known as "spas", "whirlpools" and by the brand name "Jacuzzis", the installation of Hydrotherapy-enabled bathtubs are a popular choice among consumers who want to enjoy the many health benefits of Hydrotherapy on a daily basis.

The Physical Effects Of Hydrotherapy On The Body

Hydrotherapy uses water to deliver temperature and pressure changes to the body. These changes are sensed by the body via nerve endings in the skin and muscle, and result in neural "reflex effects" that are controlled by the brain and spinal chord. The most important of these reflex effects are vasodilatation and vasoconstriction, which are the terms used to describe the relaxation and tensing of the blood vessels in the body. These physical changes in the blood vessels cause changes in the rate of blood flow and in the metabolic functions that are linked to the rate of blood flow.

Which changes happen in the body are dependent on the outside stimuli it receives; whether the water is hot or cold, the motion of the pressure, and the strength of the pressure, too.

3. Thermal Hydrotherapy

Hot and cold water act in different ways on the body. Besides the obvious tactile sensory effect, there are other "hidden" changes that take place in your body as a result of its interaction with hot or cold water.

3.1. Hot Water Hydrotherapy

In a reflexive response to external heat, your body initiates changes that help keep the body cool, including dilating blood vessels to increase the blood flow through them, diverting blood flow to the extremities and to the skin's surface, opening the pores of the skin, activating sweat glands and relaxing muscles.

Over short durations, a hot bath will cause organs of the endocrine system to become less active, particularly the adrenal gland, and can decrease blood pressure. This results in a relaxed, less stressful state and helps calm the nervous system.

Inhaling hot water vapor (steam) has a beneficial effect on the lungs as well. Moist, hot air causes the small airways and air sacs in the lungs to dilate and increases the lung's ability to move phlegm and mucus out. It can also help people breathe in more easily, since the volume of space in the lungs slightly increases.

3.1.1. Hot Water Hydrotherapy Benefits

Generally, hot water Hydrotherapy is the most popular home Hydrotherapy remedy, not only because it is the most enjoyable form of Hydrotherapy from a comfort perspective, but also because it stimulates nerve reflexes that result in the calming of the lungs, heart, stomach and endocrine system. It is often used to relax patients, promote blood flow, aid in the healing process, tone the body, stimulate the immune system, and alleviate the pain or discomfort associated with deep muscle, joint or connective tissue ailments, injuries or abnormalities.

Increased blood flow has important effects on your body, including: 1) more efficient oxygenation of tissues, thereby helping injuries heal faster, and 2) more efficient removal of toxins from tissue, which helps prevent or ease injuries and increases tissue resiliency. As a result, hot water Hydrotherapy is used to achieve many health benefits, the most popular of which are outlined below.

Fight infection and injury

By increasing the rate of blood flow in the body, hot water Hydrotherapy increases circulation of the immune system's white blood cells, enabling the immune system to work faster and more efficiently. A hot soak increases the production of endorphins in the body as well. Endorphins are the body's "pain killers" and are associated with feelings of elation or happiness. Endorphins also stimulate the immune system, alleviate pain, and help tissues heal faster.

Help clear respiratory infections

The inhalation of steam, particularly those medicated with compounds like menthol, alleviates the constriction of swollen lung canals and air sacs, allowing fluids and mucus to move out of the lungs more readily, and oxygen into the lungs more efficiently. When your body fights lung infections, they move the 'remains' of organisms it has killed (and your spent white blood cells) out of your body via mucus, so clearing mucus and fluid out of your lungs is important in helping your body clear an infection as quickly as possible.

Reduce pain and inflammation from arthritis and rheumatisms

The increase in blood flow brought about by hot water helps muscles relax, which lessens stress and pressure on joints,

thereby alleviating pain from arthritis and rheumatism. Inflammation in surrounding muscles and connective tissue is caused by a combination of cellular reactions to injury and a buildup of fluids, and when blood flow is increased, the body is able to reabsorb fluids faster and heal injury faster, helping reduce inflammation over time.

Improve sleep and relieve stress

The calming effects hot water has on the nervous and endocrine systems help put our bodies in a "lower gear", thereby relaxing us mentally. This state of heightened relaxation makes it easier for us to fall asleep and helps alleviate daily stress and anxiety.

Prevent headaches

When blood vessels dilate, the physical space our blood has to fill in our bodies increases, and therefore overall systemic blood pressure decreases. Headaches are often brought about by high pressure in the arteries of the skull, so lower blood pressure helps prevent this from happening. In addition, stress is often a culprit of constricted blood flow to the brain, which can also lead to headaches. Since hot water Hydrotherapy treatments help alleviate stress, they can also limit the onset of stress-induced headaches as well.

Help control blood sugar in diabetics

Recent studies published in the New England Journal of Medicine have shown that people with Type 2 Diabetes had an easier time controlling their plasma sugar levels and weight when they soaked in hot water for 30 minutes a day, 6 days a week. In some instances, people needed less insulin each day as well. The increased blood flow, which mimics exercise and decreases activity of the endocrine system while increasing blood circulation to and from tissues, plays a role in the body's ability to maintain glucose levels. Hydrotherapy is especially helpful in alleviating painful symptoms in people who have a harder time exercising than those who do not.

Reduce symptoms in patients with nerve, muscle or connective tissue diseases

Because hot water Hydrotherapy has a calming effect on the nervous system and helps increase blood flow to soft tissue, it helps alleviate symptoms associated with neural and muscular diseases by decreasing demands on neurons, decreasing stress in the muscles, and increasing the flow of oxygen to soft tissues, which aids in healing.

Relax muscles, heal muscle injuries, and relieve muscle disease symptoms

Hot water Hydrotherapy is especially helpful in bringing increased blood flow to the soft tissues of the body, particularly the muscles. In cases where people suffer from muscle injury or disease, hot water

Hydrotherapy can provide great relief from many muscle discomforts including cramps, swelling, pain and spasms.

Treat circulatory problems, especially in the limbs

When blood vessels dilate, as they do during hot water Hydrotherapy treatment, circulation and blood flow is increased, particularly to soft tissue like muscles. This is especially helpful in people who suffer from circulation problems, especially to the limbs and extremities. People who suffer from cold hands and feet will find that many times hot Hydrotherapy doesn't only provide an immediate relief, but that it continues to help even hours after the initial soaking period.

3.2. Cold Water Hydrotherapy

Cold water or ice has, in essence, an opposite effect on the body than hot water. Cold water and ice causes the body to try and conserve heat. As a result, blood vessels in the body constrict, decreasing the amount of blood that flows through them. Blood flow is diverted from the extremities to the core of the body and to internal organs, to help keep them warm and operating correctly. The pores of the skin close, sweat glands shut down, muscles tense, and some endocrine system organs, like the adrenal gland, become more active. Over short durations, cold water makes a person more alert and makes them feel less tired as the body activates these neural networks that work to create heat and raise blood pressure in response to the cold.

3.2.2. Cold Water Hydrotherapy Benefits

Cold water Hydrotherapy is not as popular a home remedy as hot water Hydrotherapy, mostly because it can be somewhat uncomfortable, but its regenerative and beneficial health effects are just as powerful as those experienced with hot water. Generally, cold water Hydrotherapy is used to invigorate patients who may feel sleepy, weak or mentally tired and to increase internal organ functions by diverting blood flow to the internal organs from the extremities. It also slows the heart rate and may cause slight elevations in blood pressure.

Decreased blood flow has important effects on your body, including: 1) the prevention of cellular fluid build up at the site of an injury, and 2) a calming or "numbing" effect on pain receptor nerves at injury sites. As a result, cold water Hydrotherapy is often used to alleviate swelling and pain, particularly in muscles and joints, and when used alternatively with hot water Hydrotherapy, it has proven effective in helping tone muscles, particularly in people whose mobility is limited. There are many other uses for cold water Hydrotherapy, the most popular of which are described below.

Alleviate depression

Because a short soak in cold water stimulates the endocrine system, cold water Hydrotherapy can help alleviate certain types of depression. Cold water helps a person feel more active and mentally alert, and can help people cope with feelings of sadness or tiredness.

Treat headaches

Headaches that are the result of an abnormal flow of blood within the blood vessels of the head can sometimes be successfully treated with a cold-water Hydrotherapy session. Vasoconstriction and the diversion of blood from the extremities to the core of the body will change the amount of blood flowing to the brain, relieving certain types of headaches.

Treat varicose veins

Varicose veins are the result of a build up of blood in the veins that increases the pressure in them, pushing them towards the surface of the skin, and stretching them, so they end up getting larger and holding more blood. When treated with cold water Hydrotherapy, veins in the leg constrict, forcing blood out of them. In addition, arteries in the leg constrict as well, meaning less blood is flowing through the tissues into the veins. The cold also helps "numb" pain caused by varicose veins and provides relief from the discomfort they cause.

Raise low blood pressure

Cold water Hydrotherapy can be used to combat circulatory problems, particularly in the internal organs. Since immersion of cold water constricts capillaries on the skin and diverts blood flow towards the core of the body, it also helps increase blood flow to important internal organs, like the liver, heart and lungs.

Hydrotherapy Precautions

While Hydrotherapy has many potentially beneficial health effects, too much heat or cold can affect health adversely. In addition, people with certain types of diseases and health problems should avoid Hydrotherapy or embark upon Hydrotherapy treatments only under the direct supervision of a physician. In all cases, before starting a Hydrotherapy regiment, it is important you discuss your Hydrotherapy plans with your doctor, and follow his/her advice and direction.

Once you have embarked upon your Hydrotherapy regime, be sure to monitor your progress and report any issues or side effects that arise to your doctor so s/he can make adjustments to your Hydrotherapy treatments as needed.

4. Mechanical Hydrotherapy

In addition to temperature, the physical nature and pressure of the water used in *soaking* or *full body immersion*

Hydrotherapy sessions plays an important role in Hydrotherapy's effect on the body.

Weightlessness

In water, you weigh 10% of your actual body weight, so your body is relieved of the normal pressures exerted by gravity. This "weightlessness" alleviates pressure on joints and muscles (muscles don't have to work as hard to keep body in position) helping to ease pain.

Water pressure & Underwater Exercise

Because water is denser than air, water pushes on your body more than air, helping to support body joints and muscles and making it more difficult for fluids to accumulate under the skin or in extremities. The pressure water exerts on your skin and muscles as you move your body through water can also help move blood through the veins and back towards the heart.

Water produces a soothing, massage-like sensation on the skin that results in specific responses from the brain that help calm and soothe the body. That effect is further heightened by the addition of water jets or air bubbles to the water, which enhance the sensations on the skin and in the muscles.

Water Jets

A light massage from water jets activates nerves in the skin and muscles that increase blood circulation to the massage area resulting in better tissue oxygenation, toxin evacuation, and muscle relaxation.

Air Bubbles

The gentle, tingling sensation people experience on the skin from the presence of many tiny air bubbles in water causes certain neural reflexes to activate, resulting in beneficial chemical reactions that promote muscle relaxation and a mental state of contentment.

The Delivery of Hydrotherapy to the Body

When people hear the term "Hydrotherapy", they often think of a whirlpool tub or soaking bath. For the most part, modern day Hydrotherapy does refer to this type of treatment – where a person's body is fully submerged in water – because most people perform Hydrotherapy at home in their own Hydrotherapy-enabled bath tubs. However, in addition to soaking, there are other ways to deliver Hydrotherapy benefits to the body, including "portable" methods that don't require a fixed, large tub.

Below are a number of popular methods used today to deliver Hydrotherapy and its benefits to the body.

Compresses

A compress is a soft cloth or pad held in place by a bandage or other means of immobilization that provides moisture, either heat or cold and sometimes medication to a patient at the point of pain or discomfort, or at the point deemed appropriate for treating their ailment.

Poultices

Poultices are hot, water-based, thick compounds usually containing herbs, minerals, chemicals and/or oils that are spread on a person's skin at the point of pain or discomfort, or at the point deemed appropriate for treating their ailment.

Towel Wraps

Towel wraps are large strips of cloth soaked in hot or cold water solutions that when fully saturated, are wrapped quickly and firmly around a patient's body or body part. They in turn are wrapped in dry towels, and then allowed to dry.

Inhalations

Inhalations deliver hot or cold water to the patient's body via water vapor inhaled into the lungs. Many times, these inhalations are used to treat lung issues and will include medicinal vapors with properties that alleviate congestion, like menthol.

Soaking

Soaking means immersing the patient's entire body (also called "full body immersion") or part of the patient's body into a pool, tub or other container of water with specific heat, chemical and water pressure properties. The term "Soaking" is used to describe the immersion of an injured wrist in a bucket of ice, the immersion of a foot in a pan of hot water, the immersion of the lower part of the body in a shallow tub, the immersion of the entire body in a natural hot spring, the immersion of the entire body in a Hdyrotherapy-enabled bathtub (otherwise known as "Whirlpool tubs" or "Spas"), and any other activity that involves immersing the body or parts of the body in water for health benefits.

5. Health Benefits of Hydrotherapy

Hydrotherapy regiments can be designed to treat any number of maladies by creating different combinations of water temperature, water pressure and delivery methods. The most common ailments Hydrotherapy is used to treat include arthritis pain, back pain, headaches and muscle pain. These ailments respond well to changes in the body that are brought about by temperature and pressure differentials and by increased or decreased blood flow. But Hydrotherapy is useful for relieving the discomfort and pain caused by a variety of symptoms associated with different diseases and injuries. The researcher was designed a study to evaluate the effectiveness of hydrotherapy in sixty-four subjects with osteoarthritis (OA) of the knee compared with subjects with OA of the knee who performed land-based exercises and were randomly assigned to 1 of 2 groups that performed exercises for 18 weeks . After the treatment, the researcher

interviewed the subjects regarding to their relieving pain .Both water-based and land-based exercises reduced knee pain, but Hydrotherapy was superior to land-based exercise in relieving pain. Water-based exercises are a suitable and effective alternative for OA of the knee. Table .1 displays the exercises performed during the experiment between two groups.

Table 1.

Description of exercises performed between two groups with osteoarthritis (OA) of the knee

Land-Based Exercises	**Water-Based Exercises**
Stretching: -In a sitting position, cross one leg over the other and place one hand on top of the foot to grasp the toes; pull and hold for20 s -In a supine position, with the knees flexed so that the feet are resting comfortably in a flat position, raise the exercise limb with the knee in full extension using a band around the foot to maintain dorsiflexion; hold the stretch for 20 s -Lying on your side with the exercise limb on top, keep both knees together and the lower leg straight; bend the top knee by grasping the foot with the hand; bring the heel as close to the buttocks as possible; hold the stretch for 20 s	Stretching: -In a sitting position, with your back against the side of the pool, cross one leg over the other and place one hand on top of the foot to grasp the toes; pull and hold for 20 s -In a sitting position, with your back against the side of the pool, straighten one knee using a band to raise the foot in dorsiflexion and hold for 20 s -In a standing position, holding onto the edge of the pool, bend one knee (heel up toward buttocks), hold the raised foot with one hand, and gradually push the pelvis forward, holding for 20 s -In a sitting position, with your back against the side of the pool, straighten one knee using a band to raise the foot in dorsiflexion and slowly move the foot outward to the side, holding for 20 s
Isometric strengthening: -In a supine position, with the knees straight, perform dorsiflexion and hold for 6 s -In a supine position, with the knees straight, perform plantar flexion and hold for 6 s	Isometric strengthening: -In a supine position, with cervical and pelvic floaters, perform dorsiflexion and hold for 6 s -In a supine position, with cervical and pelvic floaters, perform plantar flexion and hold for 6 s
Isotonic strengthening: -In a supine position, with the knees flexed so that the feet are resting comfortably in a flat position and with the hands resting by your sides, raise the midsection to make a straight line through your knees, hips, and shoulder (bridge); extra resistance provided by 1-kg ankle weights. -In a supine position, with both legs resting on a triangular support and the knees flexed at a 30° angle, straighten one leg; return and repeat with the other leg; extra resistance provided by 1-kg angle weights. -In a supine position and the contralateral limb knee flexed so that the foot is resting comfortably in a flat position, raise the exercise limb with the knee in full extension to the height of the contralateral flexed knee, then lower the limb back to the initial position; extra resistance provided by 1-kg ankle weights -Lying flat on your back with both legs straight, place an elastic band around the thighs just above the knees and perform thigh abductions; extra resistance provided by elastic bands.	Isotonic strengthening: -In a standing position in front of the wall, hold the wall with your hands, lift the leg backward to a comfortable height; return and repeat with the other leg; extra resistance provided by floaters and increased speed. -In a standing position, with your back against the side of the pool, slowly lift the leg straight forward to a comfortable height; return and repeat with the other leg; extra resistance provided by floaters and increased speed. -In a supine position, with certival and pelvic floaters, bend and straighten the knees with sustained dorsiflexion; extra resistance provided by floaters and increased speed. -In a supine position, with cervical and pelvic floaters, perform abduction and adduction of the thighs with sustained dorsiflexion; extra resistance provided by floaters and Increased speed. -In a sitting position, with floaters under the arms, straighten the knee with the foot in dorsiflexion and bend the knees with the foot

-Lying flat on your back with both legs straight, place a ball between the knees and perform thigh adductions; extra resistance provided by 1-kg ankle weights -Lying sideways, bend the knee and hip of the lower leg and raise the upper leg, keeping it straight; extra resistance provided by1-kg ankle weights. -In a supine position, with the knees flexed so that the feet are resting comfortably in a flat position and with hands on your thighs, slowly slide the hands along your leg up toward your knees and bring your shoulders and head up; extra resistance provided by 1-kg angle weights.	in plantar flexion while moving forward in the pool; extra resistance provided by floaters and increased speed. -In a sitting position, with floaters under the arms, straighten the knee with the foot in plantar flexion and bend the knees with the foot in dorsiflexion while moving backward in the pool; extra resistance provided by floaters and increased speed -In a standing position, rise up on your toes and return; extra resistance provided by the increased speed.
-In a prone position, slowly pull one heel toward the buttocks; return and repeat with the other leg; extra resistance provided by 1-kg ankle weights. -In a standing position, rise up on your toes and return; extra resistance provided by 1-kg ankle weights.	Gait training: -Forward walking with alternated movement of the upper and lower extremities -Walk raising the knee -Lateral walking -Backward walking
Gait training: -Forward walking with alternated movement of the upper and lower extremities -Walk raising the knee -Lateral walking -Backward walking	

96% participants in water-based group claimed that their pain has reduced than before the treatment, but 81% participants in land-based group had less pain concerning before the treatment.

The results indicate that water-based and land-based exercises reduced pain and improved function in patients with OA of the knee but water-based exercise was superior to land-based exercise for relieving pain after the treatment. These findings indicate that hydrotherapy is a suitable and effective exercise for patients with OA of the knee and should be included in the therapeutic approaches recommended for the management of such patients.

Conclusion

Hydrotherapy is an extremely powerful tool that is a really beneficial treatment method, particularly soon after injury. It is widely supported by research to be a great way for people with injuries to progress quickly with land-based exercises, more so than if they just did land-based exercises on their own. It is also fantastic for arthritic conditions and is now being used to treat animals as well as humans, with phenomenal effects.

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