



The Remarkable Benefits of Forest Bathing

Ever since the Internet was invented, Americans have become more hostile, more distracted, more depressed, and less alert, which points to the need for change. A therapeutic technique that is considered standard preventative medicine in Japan may help. It is called forest bathing, and it is becoming popular around the world. Forest bathing is when a person spends time relaxing or participating in recreational activities under the canopy of a forest, and simultaneously achieves a multitude of health benefits. The amount of time spent in a forest does not have to be long because people can experience the benefits from even a short stroll or sitting among the trees.

Although forest bathing is practiced worldwide, it originated in Japan in the 1980s, where it is known as *shinrin-yoku*. The term *shinrin-yoku* means “taking in the atmosphere of the forest” and focuses on allowing nature to enter the body using all the senses. Since 2004, the Japanese government has allocated more than 4 million dollars towards research on forest bathing (Williams 3). Akazawa Natural Recreation Forest in Nagano, Japan was recognized as a forest therapy base in 2006. It is known as the birthplace of forest bathing and it offers free medical checkups to visitors on Thursdays. In that same year, a Japanese group called The Forest Therapy Executive Committee began to classify forests by having researchers determine, through scientific evidence, whether or not the forest has relaxing properties. If a forest is found to have the desired effects, the committee gives the title of Forest Therapy Base and/or Forest Therapy Road to the location. As of 2015, Japan has 48 Forest Therapy trails earmarked for forest bathing, and 52 more will be created in the next ten years. Nearly a quarter of the Japanese population of over 125 million partakes in forest bathing, and between 2.5 and 5 million people use Forest Therapy trails every year.

There are various positive effects resulting from forest bathing. One of the effects is the enhancement of the immune system, since when people breathe in air, they also breathe in phytoncides, which are given off by plants. Phytoncides are antimicrobial organic compounds that aid plants in suppressing diseases due to their antibacterial and antifungal characteristics. Plants also use phytoncides to shield themselves from insects. Large trees give off the most phytoncides, but other plants can give off smaller amounts. The body responds to phytoncides by increasing the number and activity of natural killer (NK) cells, which are a type of white blood cell, whose job is to kill cells in the body that are infected. A 2006 study regarding NK cells showed how long the effects of forest bathing survive in the body (Li 10-12). Dr. Qing Li, from the Department of Hygiene and Public Health at Nippon Medical School in Japan, had 12 male participants, ranging from 35 to 56, take a three-day trip to three different Japanese cypress forests, also known as Hinoki forests, in Nagano, Japan. A few months before the forest trip, most of the men took a three-day trip to Nagoya city. Both trips involved the same walking routine for each day. The forest trip increased the number and activity of NK cells in the participants for as long as 30 days after the fact, whereas the city trip did not increase the number or activity of NK cells in the participants.

The benefit of phytoncides to humans was confirmed in another study Dr. Qing Li and others conducted in 2006 and 2007 regarding NK cells (Li et al. 952-3). There were 12 participants, ranging from 37 to 60 years old, who stayed in a hotel in the city for three consecutive nights. The men had a set time when to be in their rooms and when to go to sleep each night. During the study, the participants went to work each day, completed questionnaires daily, provided urine samples daily, and had their blood tested on the first and last morning. At night, humidifiers in the hotel rooms vaporized oil from Hinoki trees, and thus introduced phytoncides to the participants artificially. The results showed increased activity of NK cells in participants’ bodies.

Another benefit of forest bathing is the decrease in stress levels, as evidenced through a decline in the amount of stress hormones, such as cortisol and adrenaline, in the body. When the body is in a “fight-or-flight” situation, the hypothalamus, a section of the brain, triggers the adrenal glands to release these stress hormones into the bloodstream. Adrenaline increases breathing rate, heart rate, and blood pressure, while cortisol increases blood sugar. Both stress hormones minimize the activity of the digestive system, reproductive system, and growth processes. Experts at the Mayo Clinic state

that overexposure to these hormones increases the risk of memory and concentration difficulties, heart disease, digestive issues, sleep issues, weight gain, depression, and stress ("Stress Management" 2).

A 2005 and 2006 study regarding cortisol showed how walking or sitting in a forest can decrease the amount of stress hormones in the body (Park et al. 19-21). Yoshifumi Miyazaki, from the Center for Environment, Health and Field Sciences at Chiba University in Japan, conducted 24 experiments with four other researchers, which took place in various locations. There were 12 participants, Japanese college men, ranging from 20 to 23, who were divided into two groups. During the experiment, the men lived in identical rooms and ate identical meals. On the first day, 6 men went to a city location, and the other 6 went to a forest location. On the second day, participants switched locations. When at the locations, the men sat in the area for 12 to 16 minutes, and then they walked around the area for 11 to 21 minutes. The results show that the amount of salivary cortisol was much lower in the participants who had been in the forest location. There was a 13.4 decrease in cortisol after sitting in the forest and a 15.8 decrease after walking in the forest. Also, the pulse rate, systolic blood pressure, diastolic blood pressure, and sympathetic nervous activity decreased when the men were in the forest location.

The positive effects of forest bathing were also recognized in a long-term study conducted by researchers from the Hokkaido University School of Medicine in Japan regarding cortisol (Ohtsuka, Yabunaka, and Takayama 125-6). There were 87 participants, 29 males and 58 females, who were all non-insulin-dependent diabetic patients. The participants were split into two groups and after 10 minutes of stretching they walked in a forest for 3 km, a short distance, or 6 km, a long distance. Blood samples were taken from the participants before and after the walk to determine their blood glucose levels. The participants walked in a forest 9 times over 6 years. The results show that the participants' average blood glucose levels after short- and long-distance walks decreased by 74 mg and 70 mg respectively.

Spending time in or looking at pictures of forests has been shown to increase the ability to focus. Researchers at the University of Michigan conducted two studies regarding attention and concentration abilities (Berman, Jonides, and Kaplan 1208-10). In the first study, the participants were 38 university students, 23 females and 15 males. Before the experiment, the participants took a mood test, performed a directed-attention task, and a task to fatigue them. Then, they took 50-to-55-minute walks in a nearby park. Afterwards, the participants completed a mood test, a fatigue test, and answered questions about the walk. A week later, they did the same routine and testing downtown. The participants' performance on the directed-attention test improved after they walked in a park, but not after the walk downtown. The second study was similar, except the participants looked at pictures of nature and downtown instead of visiting them. Research supported the hypothesis that looking at pictures of forests can have benefits. The participants looked at the nature set and urban set of pictures separately. The amount of time the participants had to look at one set, which consisted of 50 pictures, was 10 minutes. Afterwards, the participants took a mood test and an attention test. The participants' performance on the directed-attention test improved after they looked at the pictures of nature.

Another promising effect of forest bathing is that it aids people with Attention-Deficit/Hyperactivity Disorder (ADHD), a disorder involving attention inconsistencies. Researchers at the University of Illinois conducted a study to determine if various environments have an effect on the attention span of children with ADHD (Taylor and Kuo 1-4). There were 17 participants, 15 boys and 2 girls, ranging from 7 to 12 years old. Each child walked through a park, a downtown area, and a neighborhood in random order. Before the walks, each child solved a group of puzzles, to promote attention fatigue. The walks took 20 minutes with a guide, without having taken any medication beforehand, with the time and day of the walk being kept constant for each week. All participants walked at the same speed, in the same weather, and the amount of conversation with the guide was kept low. After the walks, each child rated the walk and took tests regarding concentration and impulse control. The results showed that the walks through downtown and neighborhood settings did not promote any differences in concentration in the participants; however, the walk through the park promoted better concentration in the participants. Also, the children thought the walk through the park was more relaxing compared to the walks through the downtown and neighborhood settings. Currently, researchers are looking into how forest-bathing techniques can aid people with ADHD.

Viewing forests through a window has been shown to speed up the recovery of hospital patients. In 1984, researchers on behalf of the American Association for the Advancement of Science collected records from 1972 to 1981 in a suburban Pennsylvania hospital (Ulrich 1-2). There were 46 subjects, 30 female and 16 males, ranging from 20 to 69. All subjects were patients at the hospital and had gone through a cholecystectomy, a gall bladder surgery. The patients were paired by sex and age, and the pairs had identical rooms, each with one window, on the second and third floors of a three-story

wing. The windows gave the subjects a view of either deciduous trees or a brick wall. Information used from the patients' records includes but is not limited to days in the hospital, pain relievers taken each day, minor issues, and notes from the nurses at the hospital. The records showed that the patients with the natural view spent fewer days in the hospital, received more positive notes from the nurses, took fewer analgesics, took weaker medications, and had fewer postsurgical issues than the patients with the view of a brick wall.

The availability of environments that provide forest-bathing benefit is negatively impacted by a number of factors. One example is the emerald ash borer (EAB), a beetle that bores into wood and kills ash trees within years after infestation. Since 2002, the influx of EAB gives evidence for the connection between tree-loss and human health. In 2013, the American Journal of Preventative Medicine published a study by G. H. Donovan and others about human deaths attributed to heart and lung disease in counties where the beetles were infecting the trees. The results showed that EAB was associated with an additional 6,113 deaths related to lung disease and 15,080 deaths related to heart disease across 15 states. Another factor limiting access to forests is urbanization. While humans have lived in forest habitats for approximately 5 million years, humans have only lived in cities for less than 2 thousand years. In 2008, more people were living in urbanized areas than those who were not, with more than 80 percent of Americans living in urbanized areas as of 2010. It is predicted that one half of the human race worldwide may be living in urbanized areas in the next 50 years. Deforestation is also a factor, since people who live in areas affected by this process have lost the ability to take part in forest bathing until new trees are planted and grow, which can take years.

Partaking in forest bathing can result in remarkable benefits for the body, as well as the mind, and there are many ways to incorporate the therapy into daily life. People can exercise in a park by hiking, jogging, or bicycling. Another option is for people to participate in recreational activities in a forest, such as gardening, fishing, walking dogs, having a picnic, going to an outdoor yoga class, observing wildlife, and volunteering in a park. A simple alternative for urban dwellers is for people to take a break from their work and sit under the trees. If it is not feasible for people to visit a forest or park, they can look at pictures of forests. It would also benefit everyone to take a vacation to a heavily forested area and spend time under the trees. Forest bathing is medical advice that is easy to follow, and as it gains interest in America, doctors may soon be recommending it to everyone.

By Chelsea Carver, 2015