Shinrin-yoku/ Forest bathing: A natural way to promote health, prevention and cure diseases. The heritage of Master Peter Dunov in Forest Medicine

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Abstract: *Shinrin-yoku or Forest Bathing is a traditional Japanese practice that involves immersing oneself in nature and mindfully engaging all five senses. This practice was introduced by the Japanese government in the 1980s to help urban residents cope with work-related stress. There are currently 60 studies available in the medical database PubMed that are related to Shinrin-yoku. Publications can be divided into the following main areas: health promotion, disease prevention, and treatment. The effects of forest bathing on health include improved cardiac and vascular function, blood pressure-lowering effects, decreased blood glucose levels in diabetic patients, pain reduction, enhanced mental health, benefits for neurological rehabilitation, support for individuals with intellectual disabilities, and potential benefits for COVID-19 recovery. The research draws a parallel with the heritage of Teacher Dunov in forest therapy.*

Key words: Shinrin-yoku, Forest Medicine
Ключови думи: Shinrin-yoku, горска терапия

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1. FOREST BATHING

Forest medicine is a new interdisciplinary science belonging to the categories of alternative medicine, ecological medicine and preventive medicine that studies the effects of the forest environment (forest bathing/Shinrin-yoku) on human health. People have enjoyed the forest environment for centuries because of its quiet atmosphere, beautiful scenery, mild climate, pleasant scents and fresh, clean air. In recent years, a series of scientific studies have been conducted in Japan to investigate the effects of the forest environment on human health[1].

Tokyo's Arisugawa-no-miya Memorial Park offers such an environment, with its dense forests, hills, valleys, lakes and waterfalls, amidst natural beauty, providing a tranquil escape for stressed-out city resindents. Walking along the streamside paths, amidst the sounds of chirping birds and bubbling water, brings the feeling of being deep in the mountains.

[1] *Qing Li* 2019.

Figure 1, 2 and 3. Arisugawa-no-miya Memorial Park in Tokyo.

2. SCIENTIFIC RESEARCH IN PUBMED

We currently found 60 studies in the PubMed medical database that are related to Shinrin-yoku (Fig. 4). In Japan, serial studies have been conducted since 2004 to investigate the effects of forest environment on human health (forest bathing/ Shinrin-yoku)[2]. These studies investigate various aspects of health and potential benefits of incorporating Shinrin-yoku. Publications can be divided into the following main areas: health promotion, prevention and treatment of diseases.

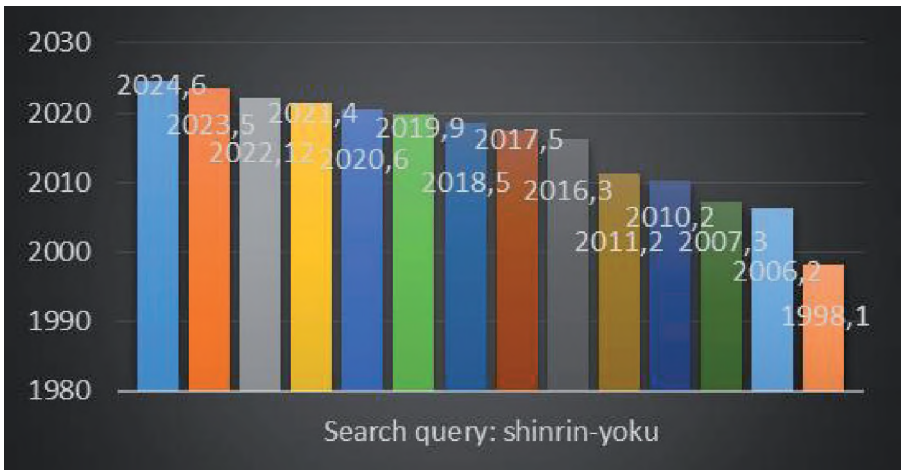

Figure 4. Scientific research in PubMed.

HEALTH PROMOTION

Includes activities and initiatives aimed at improving overall health and well-being. Health promotion also includes educating people about healthy lifestyles, promoting physical activity, good nutrition and mental health practices. The results of practicing SY have shown that the natural environment has significant benefits for the mind, body and soul in different age groups. Ongoing research is being promoted globally for short and long term health outcomes for all individuals[3].

In their study, Song, C., et al. evaluated the physiological and psychological effects of short walks in the woods on young women. The experiments were conducted in 6 forests (test) and 6 urban areas (control). A total of 60 participants, average age: 21.0 ± 1.3 years, were instructed to walk in a forest and an urban area for approximately 15 min. Simultaneously, their heart rate variability, blood pressure and pulse rate were measured to quantify the physiological response from practice. Walking in the woods was associated with significantly

[2] *Qing Li* 2019.
[3] *Vermeesch et al.* 2024.

higher parasympathetic nerve activity and lower sympathetic nerve activity as well as heart rate. Negative feelings, such as tension, anxiety, depression, despondency, anger, hostility, fatigue, and confusion, were significantly lower, as were general mood disturbance and measures of anxiety. Subjective ratings were generally consistent with physiological responses. In conclusion, the authors say that a short walk in the woods leads to physiological and psychological relaxation effects in young women[4].

Other studies have tracked salivary amylase activity as an excellent indicator of changes in sympathetic nerve activity. After measuring salivary amylase activity before and after walking in urban and forest environments using a handheld monitor, results showed that circadian rhythm fluctuations in salivary amylase activity were much smaller than variations induced by a stressful environment. In conclusion, the forest is a good environment in which people can experience much less stress arising from the environment[5].

DISEASE PREVENTION

Shinrin-yoku, or forest bathing, has received increasing attention from a preventive medicine perspective in recent years. These studies focus on measures taken to prevent the onset of diseases or to detect and treat diseases at an early stage. Disease prevention aims to reduce risk factors and eliminate causes of disease, thereby minimizing the frequency and impact of disease on individuals and communities.

Park, B. J., et al. review previous research on the physiological effects of Shinrin-yoku and present new results from field experiments conducted in 24 forests in Japan. Salivary cortisol, blood pressure, pulse rate, and heart rate variability were used as indices. The results showed that the forest environment promotes lower cortisol concentrations, lower heart rate, lower blood pressure, greater parasympathetic nervous system activity, and lower sympathetic nervous system activity than the urban environment. These results will contribute to the development of a research area dedicated to forest medicine that can be used as a preventive medicine strategy[6].

Another study aimed to investigate the effects of bathing in the woods on salivary or serum cortisol levels as a biomarker of stress to see if this method could reduce stress. The main results of the meta-analysis showed that salivary cortisol levels were significantly lower in forest groups compared to urban groups. Overall, forest bathing may significantly affect cortisol levels in the short term in such a way as to reduce stress, and the expected placebo effects may play an important role in this. Further research is recommended due to the limited data available[7].

TRENDS IN THERAPEUTIC RESEARCH AND TREATMENT OF DIFFERENT DISEASES ARE CONCERNED WITH THE FOLLOWING TOPICS:

- Cardiovascular function. Blood pressure lowering effect;
- Lowering blood sugar levels in diabetic patients;
- Shinrin-yoku as a possible method to reduce stress and achieve mental health;
- Mental health
- The interconnection of Shinrin-Yoku and spirituality;
- Neurological rehabilitation;
- COVID 19

CARDIO-VASCULAR FUNCTION. BLOOD PRESSURE LOWERING EFFECT

Some studies report that the forest environment reduces blood pressure. However, little is known about the possibility of antihypertensive uses of Shinrin-yoku. The study by Yuki Ideno et al. specifically evaluated the preventive or therapeutic effects of the forest environment on blood pressure. This

[4] *Song* 2019.
[5] *Yamaguchi* 2006.
[6] *Park et al.* 2010.
[7] *Antonelli, Barbieri & Donelli* 2019.

systematic review showed a significant effect of Shinrin-yoku on reducing blood pressure. Systolic and diastolic blood pressure among forest environment was significantly lower than that without its application[8].

Another study tracking the effects of forest bathing in adults suffering from prehypertension or hypertension so as to provide guidance for future interventions or research. Fourteen articles eligible for inclusion in this review revealed that forest bathing interventions were effective in reducing blood pressure, lowering pulse rate, increasing heart rate variability (HRV) power, improving cardiopulmonary parameters and metabolic function, inducing positive mood, reducing anxiety levels and improving quality of life of participants with prehypertension or hypertension. Forest walks and forest therapy programs were the two most effective forest bathing interventions. Studies have reported that practicing a forest walking or forest therapy program can result in short-term physiological and psychological benefits. It concludes that forest bathing, has physiological and psychological relaxing effects on middle-aged and elderly people with prehypertension and hypertension[9].

REDUCING BLOOD SUGAR LEVELS IN DIABETIC PATIENTS

Ohtsuka, Y. Et al, investigated the effects of Shinrin-yoku (forest air bathing and walking) on blood glucose levels in diabetic patients. Eighty-seven (29 men and 58 women) non-insulin-dependent diabetic patients participated in the present study. The average blood glucose level as well as glycated hemoglobin level decreased after walking short and long distances, respectively. Because the forest environment causes changes in hormone secretion and autonomic nervous functions, it has been suggested that in addition to increased calorie consumption and improved insulin sensitivity, walking in a forest environment has other beneficial effects in reducing blood sugar levels[10].

SHINRIN-YOKU AS A POSSIBLE METHOD TO REDUCE STRESS AND ACHIEVE MENTAL HEALTH

There is a growing awareness that spending more time in nature is associated with improved human well-being, yet the prescription for SY/forest bathing is still limited. The aim of this systematic review was to examine the physiological and psychological benefits of different forest therapies on healthy and pathological adult populations (>60 years) to identify the most effective type, duration and frequency of these interventions. Walking in the woods, alone and in combination with other activities, is the most effective intervention. Selected studies reported positive effects on physical indicators, including reductions in blood pressure and heart rate and improvements in cardiopulmonary and neurochemical parameters. Beneficial changes have also been noted in the psychological domain, with improvements in depression, reduced stress levels and improved quality of life. In conclusion, the authors note that walking in the forest may play an important role in promoting physical and mental health in healthy and pathological adult populations. However, the lack of high-quality studies limits the power of the results, requiring more trials[11].

Other studies have also tracked the physiological and psychological benefits of the Japanese natural therapeutic practice SY. This review article has narrowed its focus to include recent literature on the beneficial effects of forest bathing on heart rate variability, expressed as an increase in InHF, indicating activation of the parasympathetic nervous system and also its effect on reducing anxiety[12].

Emi Morita's study aims to find out if walking more often in the forest is associated

[8] *Ideno et al.* 2017.
[9] *Yau & Loke* 2020.
[10] *Ohtsuka* 1998.
[11] *Piva et al.* 2022.
[12] *Farrow & Washburn* 2019.

with better sleep quality. In conclusion, the results suggest that increasing the frequency of forest walks or Shinrin-yoku can be effective in preventing insomnia in women[13].

The present study suggests that bathing in the forest may have potential preventive effects on depression (depressive status). The forest bathing program significantly increases serum serotonin levels and significantly increases the vitality score and decreases the fatigue score in the follow-up tests. The forest bathing program also improved alertness on rising in the morning and the feeling of refreshment (recovery from fatigue)[14].

PSYCHOLOGICAL EFFECTS OF FOREST ENVIRONMENT ON HEALTHY ADULTS: SHINRIN-YOKU AS A POSSIBLE METHOD TO REDUCE STRESS AND IMPROVE MENTAL HEALTH

The study by E. Morita et al. reveals that the forest environment is beneficial in terms of acute emotions, especially in chronic stress conditions. Accordingly, they considered that shinrin-yoku could be used as a method of stress reduction, and the forest environment could be considered therapeutic. It can help reduce the risk of diseases associated with psychosocial stress[15].

Good mental health helps people reach their full potential, cope more easily with the stresses of everyday life, and be more productive and communicative with others.

THE INTERCONNECTION OF SHINRIN-YOKU AND SPIRITUALITY

Besides the fact that Shinrin-yoku (SY/ bathing in the forest) improves people's physiological and psychological health and well-being through the conscious use of the five human senses while relaxing in a natural environment, in addition, it can be effective in enhancing or revealing human spirituality. The World Health Organization defines an individual's well-being as realizing the fullest possible physical, psychological, social, spiritual and economic self[16]. Recent evidence suggests that nature promotes spiritual well-being. Reviewing the scope of the literature on the evidence of the SY/ nature-spirituality connection in order to identify knowledge gaps and to support further empirical research, the authors find that, despite differing research methodologies and publications, nature can have a positive effect on human spirituality and therefore enrich well-being. They conclude that SY is an integrative practice that can enhance and promote human spirituality. More research is needed to determine the relationship between SY and human spirituality in achieving the fullest possible self-development[17].

COVID 19

In a review of the literature on finding non-medical strategies to reduce serum cortisol levels during COVID in medical professionals, author J. Pasieka recommends that everyone personally explore different therapies and incorporate some of them into their daily routine in the future as primary methods of prevention and recovery after illness. Some of these therapies include yoga practices, Shinrin-Yoku or 'bathing in the woods', music, art, etc[18].

The human health benefits associated with immersion in nature continue to be researched. Longitudinal studies conducted globally are needed to generate new evidence on the links associated with Shinrin-Yoku and clinical therapeutic effects. Natural therapy as a method of health promotion and potential universal health model is associated with reducing the reported modern 'stress state' and 'technostress' contributing increasingly to increased disease[19].

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[13] *Morita* 2024.
[14] *Li et al.* 2022.
[15] *Morita* 2007.
[16] *WHO* 2010.
[17] *Hansen & Jones* 2020.
[18] *Pasieka* 2021: 171 (1), 94–95.
[19] *Hansen et al.* 2017.

THE HERITAGE OF THE TEACHER PETAR DUNOV IN FOREST MEDICINE

'Man must live according to the laws of nature'.

The problems of today's society caused by increased levels of stress, overwork and exhaustion are lowering resilience and contributing increasingly to increased mental and somatic illness by reducing quality of life. This is increasing interest and attention in seeking a way out and finding adequate ways to maintain good physical and psycho-emotional health. More and more physicians, therapists, and scientists are attributing their observations and achievements to the natural lifestyle. Nature as a primordial and natural way of healing and preventing various diseases can contribute to keeping us healthy physically and mentally. It is a good alternative to reduce stress and tension which are the root of most diseases today. According to Master Peter Dunov, we can have a normal and healthy life only when we use our body's energy properly and perceive the energies from the outside world, from the rational nature, correctly. He says, 'Love the living nature, the plants, the forests, in order to connect with the forces that are at work in them. They are a store house of energy from where man can draw what is needed for his organism'[20].

'The first task of science is to provide such knowledge that will ensure man's health'[21]

As early as the beginning of the last century, Peter Dunov puts forward a theory according to which regular physical activity is the key to man's physical and mental health. He also believed that a lack of sufficient movement leads to worsening health, and that appropriate physical activity regulates blood circulation, supports the functions of the various systems in the body, strengthens the will, enhances thought and has a beneficial effect on the emotions. Peter Dunov recommends regular exercise and complexes, breathing practices, walks and excursions in nature to preserve health[22]. It can be said that Master Dunov gave in his speech 'the key concepts of the holistic worldview of man and his health and laid the foundations of holistic medicine in Bulgaria'[23].

'No pharmacy in the world can give man what nature gives him'.

PANEURHYTHMY

Figure 5. Paneurhythmy.

[20] *Dunov* 1949: 92.
[21] Ibidem.
[22] *Chervenkova* 2013: 46.
[23] *Dunov* 2010: 9.
[24] *Jonov* 2003: 13.
[25] *Dunov* 1938: 65; *Dunov* 1995: 5-13.

'Paneurhythmy is a reasonable exchange with the forces of living nature'.

The role and place of man in nature and his relationship to the origin of life finds its philosophical grounding in Paneurhythmy[24]. Paneurhythmy is a unique Bulgarian system of motor exercises for health, performed to music, in pairs, arranged in a circle, in nature. The aim of Paneurhythmy is to contribute to the improvement of health, stimulate spiritual development and to achieve harmony of man with nature. It is a highly effective practice that takes care of both body and spirit. According to Master Dunov, Paneurhythmy is created to accurately reflect natural rhythms and cosmic rhythms. The activities of Paneurhythmy are rhythmic and very closely related to the rhythm of nature[25]. It is the cyclicity of physiological processes that provides the regulation in the human organism[26]. Paneurhythmy has a complex effect as it is built on the unity of movement, music and nature[27].

'Paneurhythmy is a science that regulates the physical, spiritual and mental functions of man'.

'While practicing Paneurhythmy one draws strength from the living energies of nature and gets in sync with the natural rhythm'.

GUIDELINES FOR SCIENTIFIC STUDIES RELATED TO EMPIRICALLY KNOWN BENEFITS OF THE PANEURYTHMY

Practicing the exercises of Paneurhythmy creates prerequisites and conditions for achieving a positive effect in the following areas[28]:

- Strengthening of the locomotory system and improvement of the posture, reversal of spinal curvatures and their correction, if present.
- Restores mobility and joint function.
- Improving general performance and physical condition.
- Prevention of cardiovascular diseases and metabolic diseases – stabilizes blood pressure and normalizes metabolic processes.
- Fine regulation at the level of the respiratory, nervous and endocrine systems.
- Reduces stress and increases resistance to it. Reduces depressive symptoms.
- Reports an improvement in mood and self-esteem.
- Improving the general mental tone and the body's defences.
- Impact on intellectual and emotional development
- Stimulating the creative activity of the personality and aesthetic education.
- The vigorous exercise regime is suitable for people with health problems, for recovery and health maintenance[29].

WHAT IS THE IMPACT OF PANEURHYTHMY?

Impact on the physical condition

Playing outdoors, in the fresh air and smooth deep breathing improves blood circulation[30]. This has a healing effect on the respiratory system and normalizes blood circulation. Muscle tone, body fitness and blood circulation are improved, which eases the work of the heart. It also improves the functions of the cardiovascular, nervous and endocrine systems. Stabilization of blood pressure is reported. In patients with diabetes, metabolic processes are normalized. Peter Dunov points out that Paneurhythmy also promotes good physiological effects and balance of the 'respiratory, brain and digestive systems'[31].

Impact on the mental and spiritual state

Mastering coordination in movements improves the ability to concentrate and provides stability of attention. The cognitive processes for imaginative and positive thinking, for emotional experience under the influence of music and text of individual exercises are enriched. Perceptions and representations

[26] *Chervenkova* 2013: 59.
[27] *Kajkov* 2007: 9.
[28] *Jonov* 2003: 15.
[29] *Kajkov* 2007: 17; *Tilev* 2007: 120-121.
[30] *Dunov* 2000: 59.
[31] *Dunov* 2000: 52-54; *Chervenkova* 2013; *Kajkov* 2007, 14-15; *Jonov* 2003: 14-15, *Tilev* 2007: 131.

become more complete. The thinking process is improved. Mental resilience and perseverance are increased. Creativity is strongly developed. Willpower improves[32].

'Doctors have a high mission – to teach people to live properly, to apply the laws of rational nature!'

More and more authors are proving that Paneurythmy is not only a system for self-improvement and harmonious development of the personality, but also a superior healing method[33]. Here are outlined the main distinct effects of Paneurhythmy, which for us as researchers are a broad field for further research in search of methods and scientific approaches to prove and more fully clarify its all-round impact on the personality[34].

CONCLUSION

The new medical science called forest medicine includes all the beneficial natural influences that immerse a person in a relaxing and pleasant environment for the senses and spirit. In combination with moderate physical activity, they have a comprehensive and positive influence on many components of the psycho-physical state. This natural diversity gives us the choice of how to achieve health and harmony easily and affordably through nature's richness. Paneurhythmy is a valuable part of Bulgarian spiritual and cultural heritage and its good knowledge and application can contribute to effective maintenance of physical condition, mental health and well-being, social functioning and improved quality of life (**Fig. 6**).

Figure 6. Rila lakes.

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[33] *Lambova et al,* 2006-2007: 117; *Ancheva* 2006-2007: 103; *Chervenkova* 2013.
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Shinrin-yoku / Горско къпане: естествен начин за промоция на здравето, профилактика и лечение на болести. Наследството на Учителя Петър Дънов в горската медицина

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Shinrin-yoku или къпането в гората е традиционна японска практика, която включва потапяне в природата и внимателно ангажиране на всичките пет сетива. Тази практика е въведена от японското правителство през 80-те години на миналия век, за да помогне на градските жители да се справят със стреса, свързан с работата. Понастоящем в медицинската база данни PubMed има 60 проучвания, които са свързани с Shinrin-yoku. Публикациите могат да бъдат разделени в следните основни области: промоция на здравето, профилактика и лечение на заболявания. Ефектите от къпането в гората върху здравето включват подобряване на сърдечно-съдовата функция, ефекти на понижаване на кръвното налягане, понижени нива на кръвната захар при пациенти с диабет, намаляване на болката, подобрено ментално здраве, ползи при неврологична рехабилитация, подкрепа за хора с интелектуални затруднения и потенциални ползи за възстановяване от COVID-19. В изследването се прави паралел с наследството на Учителя Дънов в горската терапия.