

Elucidation of the relaxation effects of olfactory, tactile, and visual stimuli of wood on humans

Harumi Ikei (Center for Environment, Health and Field Sciences, Chiba University)

hikei@chiba-u.jp

Considering today's stressful society, there has been an increasing focus in recent years on the relaxation methods that utilize natural environments or stimuli of natural origin. Wood is a familiar natural material and is empirically known to bring comfort to humans. However, the majority of previous studies have been based on subjective evaluations such as questionnaires and interviews. In this study, a physiological system that simultaneously measures brain and autonomic nervous activities was used to accumulate basic data on the relaxation effects of olfactory, tactile, and visual stimuli of wood on humans.

- 1) **Olfactory stimulation**¹⁾ and 3 other articles: I examined the effects of the wood, leaves, and volatiles of Japanese cypress, a typical coniferous tree in Japan, on the human brain and autonomic nervous system activity. These olfactory stimuli derived from the Japanese cypress wood exhibited physiological relaxation effects, such as calming the prefrontal cortex activity, enhancing the parasympathetic nervous activity that increases during relaxation, and decreasing the heart rate.
- 2) **Tactile stimulation**²⁾ and 5 other articles: The physiological relaxation effect of palm and feet contact with wood was elucidated. Participants' palm and feet were exposed to flat wood with closed eyes, which led to physiological relaxation effects such as calming the prefrontal cortex activity, increasing the parasympathetic nervous activity, decreasing the sympathetic nervous activity, and decreasing the heart rate.
- 3) **Visual stimulation**³⁾ and other article: The physiological relaxation effect of visual stimulation by wooden wall images was clarified. Wall images of knotty and clear wood were produced and presented to participants on a large display. Results demonstrated that both knotty and clear wooden walls produced physiological relaxation effects by calming the prefrontal cortex activity, increasing the parasympathetic nervous activity, and decreasing the sympathetic nervous activity.

This study is the first in the literature to show that wood-derived olfactory, tactile, and visual stimuli exert physiological relaxation effects, such as calming the prefrontal cortex activity, increasing the parasympathetic nervous activity, and decreasing the sympathetic nervous activity and heart rate. By elucidating the relaxation effects of wood on humans, which is the subject of this study, I hope to contribute toward improving the quality of life of modern people in a stressed society and promoting the use of wood.

1) Ikei, H., Song, C., Lee, J., Miyazaki, Y.: J Wood Sci 61(5): 537–540 (2015).

2) Ikei, H., Song, C., Miyazaki, Y.: Int J Environ Res Public Health 14(7): 773 (2017).

3) Ikei, H., Nakamura, M., Miyazaki, Y.: Sustainability 12(23): 9898 (2020).