

'Space pants' could help people suffering from peripheral artery disease

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Bruno Roseguini, assistant professor in health and kinesiology at Purdue University, and a staff member acting as the patient demonstrate heat therapy pants to treat PAD. Credit: Purdue University photo/John Underwood

Purdue has produced 23 astronauts, more than any other public

institution. Now, a university professor is working with a key piece of their equipment to help people with peripheral artery disease.

According to the American Heart Association, 8.5 million Americans suffer from the disease, also known as PAD. Because of insufficient [blood flow](#) in their legs, they experience pain, fatigue and cramping while walking or climbing stairs. The pain usually subsides after a rest period but is often bad enough to prevent them from doing daily tasks.

"I have [patients](#) that have trouble going to get their mail in their mailbox," said Bruno Roseguini, assistant professor in health and kinesiology at Purdue. "These patients, in order to avoid that pain, become very inactive. So this is a vicious cycle that leads to more impairment and more functional decline over time."

Roseguini is studying heat [therapy](#) and its effect on PAD symptoms by using pants that circulate warm water over the wearers' legs. The pants are made of elastic fabric and used by astronauts to regulate body temperature while in space.

Roseguini and his team recently published a study that revealed that a single session of leg heating reduces [blood pressure](#) and increases leg blood flow in patients with symptomatic PAD.

"Based on our initial findings, it is conceivable that repeated exposures to heat therapy might enhance the ability of the arteries in the legs to vasodilate" Roseguini said. "What that means is there would be more blood flow and greater oxygen delivery to calf muscles during exercise, and we anticipate this will prolong the time they can walk before they feel pain."

Smoking, diabetes, [high blood pressure](#) and age are major risk factors for PAD, and the economic burden caused by the disease is expected to

rise over the next decade as Americans age. Roseguini calls physical exercise the "gold standard" for treating PAD, even if many patients choose other routes seeking relief. While FDA-approved drugs are considered somewhat effective at lessening the pain, side effects often keep people from taking them. Outpatient surgery for a stent to be inserted into an artery, is increasingly common, but carries a risk of restenosis where relief is short-lived. The patient, without any lifestyle changes, will often return for a similar procedure within a few years.

"The patients seem to perceive heat therapy as doable, as something that they are willing to try," Roseguini said. "Exercise is painful for these patients and leg pain is one of the main reasons for why most of these patients do not adhere to structured exercise programs. Heat therapy, on the other hand, is not painful. If anything, heat therapy might actually reduce [leg pain](#), so the patients see that as a treatment they would potentially adhere to."

Roseguini is leading a clinical trial studying the effectiveness of heat therapy. Research subjects who suffer from PAD undergo six weeks of treatment and are evaluated to see if walking is less painful after wearing the so-called space pants. It's believed that [heat](#) will allow greater blood flow in the legs, allowing more oxygen to get to the wearers' calf muscles, thereby, decreasing the discomfort.

The clinical trial is being conducted at Indiana University School of Medicine in Indianapolis. If [heat therapy](#) proves effective, Roseguini hopes the pants can be fitted with a small, battery-operated pump to allow patients to walk around while wearing them. He believes the procedure can be combined with existing treatment options in both a clinical and home setting.

More information: Dustin Neff et al. Thermotherapy reduces blood pressure and circulating endothelin-1 concentration and enhances leg

blood flow in patients with symptomatic peripheral artery disease,
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Comparative Physiology* (2016). [DOI: 10.1152/ajpregu.00147.2016](https://doi.org/10.1152/ajpregu.00147.2016)

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