

Treatment with a Push

Ultrasonic Propulsion to Treat Kidney Stone Disease: Patient Trials Begin

Narrator: Kidney stones like these cause millions of people the most intense pain imaginable. Urologist Dr. Mathew Sorenson knows first hand the pain his patients suffer.

Mathew Sorenson: I've had two kidney stones. It was terrible. It was really excruciatingly painful.

Jonathan Harper: Kidney stones are increasing in prevalence. They're found in about ten percent of the population. Kidney stones are basically very small crystals that aggregate or clump together to form a hard stone.

Narrator: A University of Washington–Applied Physics Laboratory team is working on a way to move small kidney stones inside the kidneys to reduce pain, expense, and treatment times. The moving force: ultrasound.

Bryan Cunitz: This demonstration shows the basic concept of how we would image a kidney stone, target it using diagnostic ultrasound, and then quickly send this targeted focused pulse on the stone. And in this case, you would see the stone elevate away from the transducer.

The ultrasound is completely non-invasive. So you never have to open a person up to do this treatment.

Harper: This is completely novel technology. There's nothing like it out there.

Narrator: Dr. Harper is running a 15-patient human trial of ultrasound kidney treatment at the University of Washington.

Harper: It's a feasibility study to show that we can move stones in humans. Can we move stones? Can we do it while they're awake so there's no pain – so this can be an office procedure? Can we help small stones pass? Really the goal is to relocate small stones to facilitate their passage.

Narrator: These first-ever human trials come after four years of testing the focused ultrasound system.

Barbrina Dunmire: I use the diagnostic imaging capability to focus on the stone. I find it and then I target and refocus the energy to push the stone.

So you can see when it's pushed, it moves away from the ultrasound probe. The probe is here and the stone moves in the direction of force – away from the transducer."

Narrator: Eager to find a way to treat kidney stone emergencies during long-duration missions in space, NASA is supporting the APL-UW ultrasound project through the National Space Biomedical Research Institute.

Mike Bailey: We hope to eventually commercialize this. I think we've gone as far as a research group could hope to in taking it from first principles all the way to a clinical trial. The next step now is to try to license it out of the university.

We think we have a year of approval from the FDA, more trials, and we'll continue to refine which patients are best benefitted by this. And that's the main challenge.

I hope that we're within two years of seeing this in doctors' offices being used.

Science at Work for You.

This is APL – The Applied Physics Laboratory at the University of Washington in Seattle.