

## *Toward Comprehensive Kidney Stone Disease Management* Detection, Propulsion + Comminution of Kidney Stones with Ultrasound

**Dr. Hunter Wessells:** They say that kidney stone pain may be worse than anything except childbirth – and even that’s arguable.

**Dr. Kennedy Hall:** They walk in holding their back and in a lot of pain.

**Narrator:** To ease or even eliminate that pain, researchers at the University of Washington are working on a new therapy using non-invasive ultrasound propulsion of kidney stones.

**Wessells:** Ultrasound has a lot of potential. You know these space-age things – using some wand to actually do something inside a patient’s body. That may actually come true. We can move stones.

**Michael Bailey:** This technology can help right in the doctor’s office or in the O.R.

**Hall:** Kidney stones are so common in the emergency department. They’re responsible for over a million visits a year.

**Dr. Kenneth Jaffe:** In 2013, I had quite a considerable burden of stones....

**Narrator:** In the first human subject clinical trial of ultrasonic propulsion, doctors succeeded in moving stones in volunteer subjects. The results surpassed expectations.

**Jaffe:** There was no pain involved.

**Narrator:** UW urologist Mathew Sorenson believes not only is ultrasound therapy virtually pain free and non-invasive, but it is less expensive than CT scans and does not expose patients to radiation.

**Dr. Mathew Sorenson:** We had the opportunity to try several different things with the trial. And I think in the beginning, we really focused on small stones – trying to encourage them to pass.

From all the work that we had done in the lab, we knew that we were going to be successful in moving stones around.

**Narrator:** Sorenson sees progress on three main challenges:

**Sorenson:** One of the big efforts is detection and sizing, pushing stones, and also breaking stones. If it works like we hope it will, it could replace the majority of the stone treatments that we do.

The pushing stones: there’s nothing like it. It’s a potentially transformative technology for kidney stones. If we could make stones pass while they’re small before they’re of a size to need surgery, that would potentially save patients some surgeries.

Averting an emergency would be really valuable.

And the third technology we’re working on is also another potential game changer – and that is breaking stones.

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**Craig Mundie:** I've had two bouts of stones about two years apart.

**Narrator:** Craig Mundie is a patient of UW urologist Dr. Jonathan Harper.

**Dr. Jonathan Harper:** In your case, we found a couple of things. We were able to – what appeared to be move a stone out of the kidney into the ureter and then we also found another stone that we think we may have dislodged from its anchor. A lot of the stones will grown attached to the inside of the kidney and if we can detach those when they're very small, hopefully they can pass uneventfully.

**Mundie:** It is definitely the case that, you know, if you can take them when they're little and find them through these totally non-invasive screening methods, then you know, clearly it would be better to knock them loose and let them go than to have to endure any of these things.

**Harper:** There certainly is a size where people could pass stones without much pain or even feeling nothing at all. Did you have pain during the procedure?

**Mundie:** No. There's almost no sensation at all. The only thing I recall was just a warming sensation.

**Harper:** So is your experience such that you would have done this again if it would help you?

**Mundie:** Absolutely!

**Wessells:** Our goal is to be innovative in everything we do. Patient care. Research. Education. One of the ways we do it is just by putting things together that don't normally belong and finding ways to bridge them. Engineers and urologists is one example.

Now I'm most excited about this idea that we could take a patient in the emergency department who might need a surgical intervention tonight at 3 AM and then another one a few days later to treat the stone. Could we use the ultrasound to make one of those procedures unnecessary? That's the really exciting thing.

**Hall:** Ultrasonic propulsion changes the game. It gives us the opportunity to reposition the stone or relieve the obstruction and potentially make somebody feel no pain, go home and enjoy their life – their weekend.

**Bailey:** The urologists have said this is what we want. This is how we'd like it to look and work. And we've moved as quickly as we can to establish its safety and effectiveness and we want to continue to work with the FDA to get this out there so the urologists can really see how this works, how well it fits into their practice, and where exactly they want to use it.

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