

Identifying overactive bladder issues just got easier

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Prescribing the right medicine for overactive bladder syndrome is difficult

Biomedical researchers at Massey University have just published groundbreaking research that could lead to faster diagnosis of bladder problems in women, in a leading specialist journal, the *British Journal of Urology*.

Such is the novelty and importance of the findings that they have also been reported in the clinical review section of the prestigious journal *Nature*.

Professor Roger Lentle leads the digesta group in the Physiology department of the School of Food and Nutrition, the research team that is currently investigating the relationship between normal and disordered bladder motility (the ability of the bladder walls to move and contract spontaneously). The team includes a senior consultant urologist from Palmerston North Hospital and researchers from the Institute of Veterinary, Animal and Biomedical Sciences at Massey University.

"Understanding the motility—or movement, including contractions—of the bladder is particularly important for the treatment of overactive bladder syndrome (OAB)—a debilitating disorder that affects 16 per cent of women over 40 years of age, and this increases to over 60 per cent of female rest home residents in the Western world," Professor Lentle says.

The bladder acts as a reservoir for the urine that is being continuously made by the kidneys. Its walls gradually relax as the volume of urine that is stored gradually increases. This control of the elasticity of the bladder wall prevents pressure building up inside the bladder. If the pressure is successfully controlled the bladder can accommodate the incoming urine and signals can be sent to the brain accurately indicating how full it is. This allows us to visit the toilet when it is convenient, and then allows the brain to send a conscious signal to empty the bladder.

The system for accommodating urine and controlling pressure can sometimes go wrong. Hence the pressure can suddenly go up or down, and the signal that the bladder is full suddenly activates. This can lead to distressing problems, such as frequent trips to the toilet or being "caught short" when there is not enough time to reach the toilet. This can happen

in both men and women for a number of medical reasons, but is much more common in women.

Until now there have been no tests that are able to identify the disorder in the walls of the bladder. Worse still, similar symptoms can be caused by disorders other than OAB. This means clinicians have had to rely on an expensive strategy of excluding the other, more readily identifiable, causes of the symptoms and scoring symptom intensity to evaluate treatment.

The Massey team has developed and used a novel technique termed "two dimensional video spatiotemporal mapping" to visualise and track the minute movements made by the bladder wall during its accommodation of incoming urine.

"The mapping algorithm works by mathematically comparing successive frames of a video film so that minute changes not visible to the human eye can be identified. The results are plotted with a colour code identifying the areas of greatest movement and overlaid onto successive frames of the original video," says Professor Lentle. The results were surprising.

"We thought that the entire bladder wall would contract or relax simultaneously to reduce pressure, but it turns out that adjustment occurred in patches and that these patches migrated in continuous circuits over the surface of the bladder."

Seeing this activity meant researchers could then determine the size of the patches, the rate at which they moved over the surface of the bladder and the time taken for them to complete a circuit.

"The results may be a game-changer in the diagnosis of OAB, as we hope that comparisons of similar measurements taken from people with

OAB alongside those from healthy people will give a clearer understanding of what exactly goes wrong.

"We're currently investigating ways that clinicians could map these movements using laparoscopes or cytosopes—instruments that can take videos of the [bladder wall](#) without the need for surgery. Once we have developed that technique we hope to test a large group of women with "normal" bladders, and women with OAB in order to evaluate which of these measurements are affected by the disorder," he says.

"Ultimately, if we can identify such measurements, and can provide urologists with a means of taking them, it will enable definitive diagnosis and direct testing of the effect of drugs that may control OAB in the patient."

Pro Vice-Chancellor of the College of Health Professor Paul McDonald says the research will benefit many people.

"This is just the latest series of significant research by this world-class research group conducted within our Massey Institute of Food Science and Technology (MIFST) – the largest collective of expertise of its kind in the Southern Hemisphere – that will benefit so many.

"Roger Lentle's team has a long and distinguished track record of producing important research helping us to better understand digestion and [bladder](#) problems."

More information: "Characterisation of the contractile dynamics of the resting ex vivo urinary bladder of the pig." *BJU Int.* 2015 Mar 23. [DOI: 10.1111/bju.13132](https://doi.org/10.1111/bju.13132)

Provided by Massey University

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