

This Week's Citation Classic

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Brown M & Wickham J E A. The urethral pressure profile.

Brit. J. Urol. 41:211-17, 1969.

[Depts. Urology and Medical Electronics, St. Bartholomew's Hosp., London, England]

A method was developed for measuring the urethral closure pressure and presenting this as a plot of pressure against distance along the urethra. The method, though very simple and easy to perform with commonly available apparatus, was shown to be accurate and difficult to misuse. [The *SCI*[®] indicates that this paper has been cited in over 190 publications since 1969.]

Malcolm C. Brown

Bioengineering & Medical Physics Unit
Royal Liverpool Hospital
Liverpool L7 8XP
England

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"From 1967 to 1971, I was a PhD student in medical electronics, working with a urological surgeon (John Wickham) at St. Bartholomew's Hospital, London. We were conducting a trial of the performance of implantable electrical stimulators for the treatment of urinary incontinence, and required a measurement to assess the effect of the stimulation on the inside of the urethra, which could be used for finding the correct siting for electrodes and for assessing the performance of the stimulator once implanted.

"The method we devised used a plain plastic catheter with side holes opening against the urethral wall through which water was forced at a very slow rate. The pressure inside the catheter was recorded remotely and we were able to show by theoretical and practical methods that the recorded pressure was equal to the urethral wall pressure, plus a small known error due to the infusion. By drawing the catheter

along the urethra, a complete profile of urethral pressure was drawn in just a few seconds and this could be repeated after a change in the electrical stimulation level.

"After my PhD, I moved to Liverpool to work on other aspects of biomedical engineering. I visited the US in 1977 and was surprised to find the method in widespread use, though it was interesting to find from the *Science Citation Index*[®] that there were few citations before 1974 (five years after publication). It had been used in studies of urethral physiology, neuromuscular behaviour of the urethra, and in pharmacological studies. Alternative methods (membrane catheters, or miniature transducers in the urethra) were generally more costly, and required greater attention during experiments. A large number of citations came from work which attempted to classify urethral disorders from the urethral pressure profile parameters. This was rather unsuccessful since the individual variations are large. However, sequential profiles on the same cases do appear to be useful.

"The key to the success of the method must be its simplicity. Indeed, it was so simple I was embarrassed at first. A fellow PhD student at St. Bartholomew's Hospital told me the idea was 'trivial' and that other people in the department 'make discoveries of that magnitude every day.' I often wonder if his contribution to medical research has ever been recognized.

"The discovery of the interest in such simple methods of measurement has led me to associate with a research group in Liverpool working on urinary incontinence in women. We have recently developed two new measurement techniques, one to demonstrate the severity of urinary incontinence,¹ and another to show incompetence at the bladder neck.^{2,3} Both of these new measurements use the most simple apparatus, provide readily comprehensible information, and cannot easily be misused. Based on experience with the 1969 paper, we expect it to be some years before we can properly assess their impact."

1. Sutherland J, Brown M & Shawer M. Assessing the severity of urinary incontinence in women by weighing perineal pads. *Lancet* 1:1128-30, 1981.
2. Brown M C & Sutherland J. A test for bladder neck competence: the fluid bridge test. *Urol. Int.* 34:403-7, 1979.
3. Shawer M, Brown M & Sutherland J. Diagnosis of bladder neck incompetence without use of capital equipment. *Brit. Med. J.* 283:760-1, 1981.