

# On the attempted resuscitation of the pressure transmission theory for urethral closure

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There have been several recent attempts to resuscitate the pressure transmission theory closure mechanism for the bladder\*<sup>1,2</sup> and with it, the Integral Theory (IT) itself. How theories can be validated or invalidated has been defined by the lifetime work of Karl Popper, the most eminent philosopher of science of the 20<sup>th</sup> Century<sup>3</sup>. Popper's view is that no theory is perfect, and that only by being continually challenged, can it be improved, modified or discarded. All these outcomes are good for science.

In 1990, The late Ulf Ulmsten and Peter Petros disproved the main prediction of Enhorning's theory, elevating the bladder into the "pressure equalization zone". Stress incontinence cure was demonstrated in 30/30 patients with no evidence of bladder elevation on post-operative x-ray<sup>5</sup>. This finding emphasizes one key rule for validation or invalidation of theories, it has to be done by experiment, which has never been done by any critic of the Integral Theory. I report two more studies which experimentally invalidate the pressure equalization theory.

A 1995 study concerned an experiment during a mid-urethral sling operation performed under LA<sup>6</sup>. Two Galectec catheters, measured urethral and bladder pressures in equivalent positions inside and outside the bladder and urethra during coughing (Table 1). The pressures inside the bladder were slightly less than outside, but universally greater inside the urethra. Only an active reflex muscle action can explain these findings, which are not possible with a passive "pressure transmission" mechanism.

In a 2009 study by Kamo et al.<sup>7</sup>, urethral closure mechanisms during abrupt elevation of intravesical pressure P(ves) were investigated in a rat experiment. During sneezing, the middle urethral closing response was observed and remained intact even after opening the abdomen. According to the pressure equalization theory, there would be no response to sneezing if the abdomen was open.

## Conflict of interest NIL

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\* It is important to note that this debate on the pressure transmission theory closure mechanism for the bladder concerns only a small part of the 2018 iteration of the IT<sup>4</sup>, which states: "Prolapse, bladder, bowel and idiopathic pain symptoms mainly derive, for different reasons, from laxity in the vagina or its suspensory ligaments, a result of altered collagen/elastin."

Table 1 <sup>6</sup>Intraoperative Cough Pressure Transmission, Vagina Intact\*

Patient	Outside bladder (T <sub>1</sub> )	Inside bladder (T <sub>2</sub> )	Outside urethra (T <sub>1</sub> )	Inside urethra (T <sub>2</sub> )
ER	30.00	26.00	18.00	23.00
KW	22.00	20.00	4.00	10.00
PB	75.00	73.00	40.00	60.00
TH	70.00	65.00	80.00	100.00
MF	22.00	19.00	24.00	45.00
Mcan	44.00	41.00	33.00	47.60

\*T1 is positioned outside the organ and T2 inside the organ