



[Neurorol Urodyn.](#) 2017 Jan 31. doi: 10.1002/nau.23197. [Epub ahead of print]

## **Valsalva versus straining: There is a distinct difference in resulting bladder neck and puborectalis muscle position.**

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### **Abstract**

#### **AIMS:**

To assess the effects of the Valsalva manoeuvre versus straining on bladder neck (BN) and puborectalis muscle (PR) position, BN stiffness and pelvic floor muscle (PFM) activation in urinary incontinent women and healthy continent controls.

#### **METHODS:**

We recruited 17 continent and 85 incontinent women. A Microtip transducer measured urethral and vesical/abdominal pressures. A surface EMG electrode attached to a sponge was placed vaginally at the pelvic floor level. BN and PR movements were assessed with perineal ultrasound. Stiffness was calculated as the increase in vesical pressure per descent of BN and PR during manoeuvres. Women were standing and asked to perform a Valsalva against a closed mouth and glottis and thereafter to relax the PFM and strain as if defecating. To demonstrate a difference of 5 mm in PR descent between Valsalva and straining with a power of 80% and  $\alpha = 0.05$ , 24 women were necessary.

#### **RESULTS:**

During Valsalva, 71% of continent and 76% of incontinent women demonstrated PFM activation, whereas during straining significantly fewer women activated the PFM (29% and 32%, respectively). During straining, BN and PR muscle descent was significantly greater and stiffness was lower than during Valsalva in both incontinent and continent women.

#### **CONCLUSION:**

Valsalva and straining are different tasks with different PFM activation patterns. The PF is stiffer with Valsalva resulting in better BN support whereas straining leads to more PR and BN descent. These terms should not be used interchangeably and women have to be instructed carefully to allow appropriate interpretation of data.

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**KEYWORDS:**

Valsalva manoeuvre; intra-abdominal pressure; pelvic floor; perineal ultrasound; straining

PMID:

28139845

DOI:

[10.1002/nau.23197](https://doi.org/10.1002/nau.23197)

[PubMed - as supplied by publisher]