



ANALYSIS OF INTRA-ABDOMINAL PRESSURE IN WOMEN DURING EXERCISE

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Pelvic floor disorders (PFD) occur when the muscles and ligaments of the pelvic floor weaken or are otherwise compromised, causing pelvic organ prolapse, fecal incontinence, and urinary incontinence. One in four women in the U.S. develops PFD in their lifetime, and many gynecologists hypothesize that increased intra-abdominal pressure (IAP) is one of the main contributors to developing PFD [1]. Due to this hypothesis, women who have PFD or have had corrective surgery for PFD receive activity restrictions to limit increasing their IAP. However, there is little consistent research into the IAP generated during daily activities and exercising, making the activity restrictions subjective. In order to better understand the IAP generated during daily physical activity in women, our lab has developed a wireless intravaginal wireless transducer (WIVT) to measure IAP [2]. We hypothesized that the WIVT could be used to measure the IAP in women during different exercises.

In order to measure the IAP, we performed an exercise trial with 46 healthy women between 19 and 54 years of age, during which the women chose 3 of 14 exercises to complete while wearing the WIVT. After data collection, we calculated the mean maximum IAP, mean area under the curve, and mean first moment of area for each exercise. Additionally, we analyzed the exercises that contained multiple sets of an activity to determine if there was a statistically significant ($p < 0.05$) increase in IAP with an increasing number of sets. We found that jumping activities and running created the highest mean maximum IAP, while calisthenics activities performed with a physioball created the lowest mean maximum IAP. Running also created the largest mean area under the curve. For all activities involving multiple sets, there was no statistically significant increase in mean maximum IAP or mean area under the curve. Based on these results we conclude that certain exercises generate lower IAP and performing sets of an activity does not significantly increase IAP. Both conclusions may help in determining which exercises women with PFD may perform to maintain a healthy lifestyle while limiting their IAP. Research into different exercises and daily activities with a larger sample of women is necessary in order to develop effective physical activity guidelines for women with PFD.

References:

- [1] I. Nygaard et al., 'Changes in physical activity after abdominal sacrocolpopexy for advanced pelvic organ prolapse', *American Journal of Obstetrics and Gynecology*, vol. 198, no. 5, pp. 570.e1-570.e5, 2008.
- [2] T. Coleman et al., 'Development of a wireless intra-vaginal transducer for monitoring intra-abdominal pressure in women', *Biomedical Microdevices*, vol. 14, no. 2, pp. 347- 355, 2011.

