The Other Diaphragm: Can **Pelvic Floor Strengthening Exercises Improve Air** Support in Flutists?

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# Objectives

Identify the muscles of the abdominal wall and pelvic diaphragm as a voluntary or involuntary muscles

Learn strengthening exercises for the pelvic floor diaphragm

Understand how a strong pelvic floor can help with air support while playing the flute

### Compartments of the Body

Thoracic cavity

- Abdominal cavity
- Pelvic cavity





#### Diaphragm

- Large dome-like muscle which extends deep into abdominal cavity (shaded green)
- Involuntary control
- Muscle separates the thoracic cavity and the abdominal cavity
- With contraction of the diaphragm, it moves downward and the lungs expand
- With relaxation of the diaphragm, it moves upward as the lungs empty and the air is forced out

### Abdominal Wall Musculature

- Note the multiple layers of different muscle groups that are utilized allowing the abdomen to move
- Air in the lungs is pushed out of the lungs with abdominal wall muscle contractions
- These muscles are under VOLUNTARY control





# **The Pelvic Floor Diaphragm**



Three structures exit through the pelvic diaphragm

Urethra

- Vagina
- Anus

 The pelvic floor diaphragm is a funnel shaped structure

The muscles are under voluntary and involuntary control

When the levator ani contracts, the pelvic floor elevates

#### The Levator Ani Muscle

- Levator ani comprised of 3 separately identified muscles (green)
- If one contracts any of the three muscles, the others contract at the same time.
- Also known as the Kegel muscle honoring Arnold Kegel who discovered in 1948 that regular exercise of the muscle improved or cured urinary stress incontinence



# How to identify the Levator Ani Muscle

How to Strengthen the Pelvic Floor (aka Kegel contractions) Identify the muscle surrounding the anus Squeeze this muscle without contracting the buttocks or abdominal muscles Slow squeezes 25 times a day (to a count of 4) Fast squeezes 25 times a day

# Why should this work?



# **Body at Rest**

Diaphragm maintains relaxed dome-like structure
Abdominal muscles are relaxed
Pelvic floor is relaxed



## Intake of Breath

- Diaphragm contracts (shortens muscle fibers) and moves downward
- Abdominal wall pushes out
- Pelvic floor remains in position
- No increase in air support



#### "Exit" of Breath (the source of flute sound)

- Diaphragm relaxes and begins returning to resting position
- If abdominal muscles contract, pressure is increased in the abdomen and exiting pressure/air support is enhanced
- If pelvic floor musculature contracts, pressure is increased in the abdomen and exiting pressure/air support is enhanced



### Implementation

- If strong abdominal muscles and strong pelvic floor muscles can increase air support, should we not exercise each with our gym work outs?
- Sit ups/crunchies/planks to strengthen the abdominus rectus
- Sit ups with twisting movements to strengthen the external and internal abdominal oblique muscles and the transversus abdominus muscles
- Pelvic floor muscle exercises/Kegel exercises
  - Do these whenever one thinks of them
  - Position does not matter
  - Try to isolate the smaller muscle groups

### Home Test

Determine how long you can hold the note with a stop watch Do 25 slow squeezes per day Do 25 fast squeezes per day RELAX the pelvic floor after the squeeze After exercising for one month, repeat the stop watch test

# **Questions?** Comments?

You can't go back and change the beginning, but you can start where you are and change the ending. C.S. Lewis



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