



## The Squat and Respiration

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### Review:

**L AIC Pattern:** (Whatever is happening on the left side the opposite is occurring on the right side. To decrease confusion I am going to talk about the position on the left side.) The left anterior ribs are in a position of ER and posteriorly in IR. This position places the left central diaphragm in a descended state compared to the right and the left posterior mediastinum in a shortened state. The anterior pelvic inlet is forwardly rotated, ER, and in abduction (IP ER which equals AF ER) and the anterior pelvic outlet is in IR and adduction (IsP IR = AF ER). This pelvis position causes the anterior pelvic floor (puborectalis/pubococcygeus) to be descended and the posterior outlet to be shortened or tight (glute max, piriformis, and coccygeus). Therefore, the left anterior chest wall and anterior pelvic outlet in this Left AIC pattern are in a position of INHALATION (the abdominals and the anterior pelvic inlet are in a lengthened position) and the left posterior pelvic outlet is in a position of EXHALATION (muscles are in a shortened position.) The pelvic inlet position integrates the respiratory and pelvic diaphragms thru the left internal obliques and transverse abdominus.

**PEC Pattern:** On both sides the anterior ribs are in a position of ER and the posterior ribs are in IR. This position causes the central tendons of the diaphragm on each side of the spine to be descended, and the bilateral posterior mediastinums to be tight or more restrictive when one inhales. The anterior pelvic inlet, on both sides, is forwardly rotated, ER, and in abduction (IP ER = AF ER) and the anterior pelvic outlet is in IR and adduction (IsP IR = AF ER). This pelvis position causes the bilateral anterior pelvic floor to descend and the posterior outlets to become taut or tight. Therefore, the bilateral anterior chest wall and anterior pelvic outlet are in a position of INHALATION and the posterior pelvic outlet is in a position of EXHALATION. The pelvic inlet position integrates the respiratory and pelvic diaphragms thru the internal obliques and transverse abdominus. The inlet position gives the thoracic diaphragm and the pelvic diaphragm POWER!

### SQUAT DESCENT:

The squat descent based on the above positioning in the L AIC or PEC pattern could be done in three different ways depending on the patient's ability to find a ZOA (outer abdominal control thru the IO/TA's) and maintain it. In the L AIC pattern, you could have your patient in a pelvic position of L inlet IP IR/IsP ER in the outlet = L AFIR. In the PEC pattern, you could have your patient's pelvis in bilateral inlet IP IR/IsP ER in the outlet by performing a slight posterior pelvic tilt. The different variations (below) are described in order of easiest to the most challenging.

- 1) The patient could squat down as they partially exhale and then exhale the rest of the way as they ascend out of the squat. This is recommended for patients who have decreased abdominal strength with ZOA or those who are lifting under a load, such as a power lifter in strength and conditioning.

By exhaling partially when these patients descend, the anterior ribs on the left side, especially in the L AIC patient or bilaterally in the PEC patient, go into IR. This position of the ribs, coupled



with the pelvic position allows the respiratory and pelvic diaphragms to ascend. Therefore support of the body weight and control of air/gas/pressure, with proper organ support occurs when the body is under load.

- 2) The patient could exhale as they squat down, hold the squat for 1 to 3 breaths, and then exhale as they come up. This is recommended for patients who have decreased abdominal strength, difficulty in maintaining a ZOA, and need **posterior** mediastinum and outlet expansion. They have a decreased ability to inhale without going into extension. This may be too challenging for patients performing an Olympic style barbell squat with heavy loads.

The exhalation upon the descent again allows for anterior rib IR and thoracic-abdominal integration with the pelvis. It allows the respiratory and pelvic diaphragms to ascend and support the body internally under load. By holding the squat position for 1 to 3 breaths, the lifter will actually implement a PRI process, by enhancing ZOA during inspiration under load. By maintaining proper anterior rib IR and pelvis position every time the patient inhales while in the squat position, **posterior** mediastinum and pelvis outlet expansion will be maximized. The patient is neurologically learning how to inhale without going into extension in the squat position!!!

- 3) The patient could also inhale as they squat down and exhale when they come up. This is a PRI goal for our patients. This is demonstrated in many PRI techniques in the new CD's. This however, can be extremely challenging in the strength and conditioning environment under a weighted load. That is why we recommend this technique for patients **who have** abdominal strength with appropriate ZOA function, but need synchronization of the respiratory and pelvic diaphragms.

Inhaling upon the descent of the squat, **with** abdominal activity and ZOA maintaining anterior rib IR with correct pelvic position, will allow the posterior mediastinum and outlet to expand with the respiratory and pelvic diaphragms in ascension. This not only supports the body internally under load, but will allow maximal power coming out of the squat, which allows our patients to PUSH and utilize the quads, hamstrings, glutes, and abdominals properly.

### **SQUAT ASCEND:**

In all of the above examples, the patient should exhale as they ascend out of the squat. Ascending out of the squat as you exhale pulls the left ribs down with IO/TA's since **L IP IR/IsP ER/AF IR** is occurring. By doing so, the patient with a PEC pattern will maintain respiratory and pelvic floor ascension. Exhalation ensures proper abdominal support for strength and conditioning, using individual body weight or added weight. Exhalation with rib IR is a concentric contraction of the IO/TA's, and therefore provides the best inhibition of the paravertebrals, allowing for the optimal position of the thorax and pelvis to push or lift out of the squat. **Inhaling and coming out of the squat would place the respiratory and pelvic diaphragms in a descended position and could create pathology** in our patients, because of poor optimization of power during lift when coming out of the squat.