



The Squat and Respiration

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Review:

L AIC Pattern: The left anterior pelvic inlet position is flexed/abducted/ER (IPER) and the outlet is extended/adducted and IR (IsPER). This left pelvis position causes the pelvic diaphragm (puborectalis/pubococcygeus) to be descended compared to the right side and the left posterior outlet (glute max, piriformis, and coccygeus) to be shortened. The left anterior ribs are in a position of ER and posteriorly in IR. This position places the left central respiratory diaphragm in a descended state compared to the right. There is decrease airflow into the right apical chest wall and the left posterior mediastinum secondary to the thorax and pelvic positions. Whatever is occurring on the left side opposite is happening on the right side.

PEC Pattern: Bilaterally the anterior pelvic inlets are flexed/abducted/ER (IPER) and the outlets are extended/adducted and IR (IsPER). Both pelvic diaphragms are positionally descended and posterior outlets shortened. The anterior ribs bilaterally are in a position of ER and the posterior ribs are in IR placing the central tendons of the diaphragm on each side of the spine to be descended. The bilateral posterior mediastinums are more restrictive with airflow and the apical chest walls are hyper inflated.

Integration: The pelvic inlet position integrates the respiratory and pelvic diaphragms thru the internal obliques and transverse abdominus. In the both the L AIC and PEC patients, emphasis is placed on obtaining the inlet in a position of extension/adduction/IR which ipsilateral ribs in IR during exhalation allowing both the pelvic and respiratory diaphragms to ascend. The ability to maintain the pelvic and rib position as stated above during inhalation on the left side with the L AIC and bilaterally with the PEC, assists with re-directing airflow in the restrictive areas in each pattern as detailed above. This is optimal for PRI treatment in allowing the body to manage internal pressure regulation and airflow as needed for forward locomotor movement.

SQUAT DESCENT for PRI Techniques:

The squat descent treatment is based on the above positioning in the L AIC or PEC pattern. We want to first promote ascension of the respiratory and pelvic diaphragms on the left side in a L AIC pattern and bilaterally in a PEC pattern. Once the respiratory and pelvic diaphragms neurologically achieve ascension as indicated by a negative Pelvic Ascension Drop Test (PADT) both diaphragms need to neurologically re-learn how to descend in a new pelvis (inlet extension/adduction/internal rotation and outlet flexion/abduction/external rotation) and rib internal rotation position/pattern. This diaphragm re-training can 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. The IO/TA's integrate the respiratory and pelvic diaphragms as they attach to the distal ribs and pelvic inlet. The different variations (below) are described in order of easiest to the most challenging to maximize respiratory and pelvic diaphragm integration for airflow and pressure regulation.

- 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 a ZOA. By exhaling partially when these patients descend, the anterior ribs on the



left side, in the L AIC patient or bilaterally in the PEC patient, go into IR. This position of the ribs, coupled with the pelvis position (inlet extension/adduction/internal rotation and outlet flexion/abduction/external rotation) 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 lumbar hyperextension (inlet flexion/abduction/ER and outlet extension/adduction/IR and anterior rib ER).

The exhalation upon the descent again promotes anterior rib IR and the pelvis in a position of inlet extension/adduction/IR and outlet flexion/abduction/ER. This position 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 patient will actually implement a PRI process, by enhancing a 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 and **neurologically as the patient inhales the respiratory and pelvic diaphragms are re-learning how to descend in a NEW pattern and position (rib IR and pelvic inlet extension/adduction/IR and outlet flexion/abduction/ER).**

- 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, is the most challenging of the squat descents. This 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 (inlet extension/adduction/IR and outlet flexion/abduction/ER), will allow for maximum posterior mediastinum and outlet to expansion with the respiratory and pelvic **diaphragms descending (contracting) in a NEW pattern and position that is dynamic and correct versus the L AIC or PEC pattern. The respiratory and pelvic diaphragms descending with correct pelvic (inlet extension/adduction/IR and outlet flexion/abduction/ER) and anterior rib IR position, not only supports the body internally under load with correct pressure regulation, but will allow maximal power coming out of the squat. When individuals come out of the squat with the respiratory and pelvic diaphragms in a maximum correct descended position the diaphragms will ascend from this maximum descended state out of the squat therefore allowing the patients to PUSH and utilize the quads, hamstrings, glutes, and abdominals properly to manage internal pressure regulation.**



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 places the ribs down with IO/TA's coupled with pelvic inlet extension/adduction/IR and pelvic outlet flexion/abduction/ER allowing the respiratory and pelvic diaphragms to ascend. Exhalation ensures proper abdominal support using individual body weight or added weight. Exhalation with anterior 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 (inlet extension/adduction/IR and outlet flexion/abduction/ER)to push or lift out of the squat. **Inhaling and coming out of the squat due to gravity, body weight, or load would be challenging to maintain rib IR and pelvic inlet extension/adduction/IR and outlet flexion/abduction/ER increasing the likelihood that the ribs would ER and the pelvic inlet would flex/abduct/ER and the outlet extend/adduct/IR causing the respiratory and pelvic diaphragms to descended creating PRI pathology** due to poor optimization of power and internal pressure management.