



Hruska ADDuction and ABDuction Lift Tests Related to PRI Reference Centers

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The Hruska ABD and ADD Lift Tests provide a wealth of information, particularly linking the gait cycle to respiratory ability, thoracic and pelvic diaphragm unison, and pattern facilitation/inhibition. The purpose of this document is to provide a connection between PRI Reference Centers to the Tests in an attempt to start to view the Tests through the lens of Reference Centers, rather than providing a connection between individual muscle sense. Asking someone what muscle they sense is sometimes more difficult for some; while asking about references outlined both in the PRI Impingement and Instability course, as well as the Non-Manual Workshop, may be more difficult for others. Using the ten references outlined in the Non-Manual Workshop (cheat sheet attached at the end of this document), along with the likely level of sensorial difficulty associated with each reference, provides an opportunity for both the tester and testee to identify what references work best, muscle sense or reference center sense.

The neuromechanical feed forward activity in the Hruska ADDuction Lift Test in a NWB position assesses the patient's/client's ability to find and feel the Moderate and High sensory processing difficulty reference centers without the benefit of the Low sensory processing difficulty reference centers. That is a benefit to us. If they can find and feel the Moderate and High sensory difficult reference centers during this test, when we stand them up and allow them to find the Low sensory difficult reference centers as a referent, integration should be a more seamless construct.

Hruska ADDuction Lift Test:

Level 1: (bottom side Hamstring/Biceps Femoris) In order to achieve a Level 1 correctly, one may not be aware of a reference center. However, if the patient/client is performing a Level 1 with correct use of the top leg, or without the top pelvis rolling backwards, they will be accessing the Moderate reference center of the bottom side Ischial Tuberosity.

Level 2: (bottom side IC Adductor and Anterior Gluteus Medius) As the individual begins to lift their bottom knee off the table without pushing their top leg into you (the tester) or rolling their top hip backwards, the reference center they should be accessing is the High difficulty Anterior Hip Capsule on the bottom side. At this point, they may become more aware of their previously accessed Moderate reference center, the bottom side Ischial Tuberosity.



Level 3: (top side Gluteus Max) Now that they are accessing one Moderate and one High sensory difficulty reference center, this level adds the Moderate difficulty reference center of the top side Posterior Hip. And the goal is to keep the previous two reference centers alive during this level with the addition of the new reference center.

Level 4: (bottom side IO/TA) To this point, we have a Moderate difficulty reference center, followed by a High difficulty, and Level 3 required another Moderate difficulty reference center. At Level 4, we are adding an additional High difficulty reference center: the bottom side IO/TA. Similar to the previous levels, the goal now is to have all four reference centers alive at the same time.

Level 5: The final reference center to be acquired during this test is another Moderate level reference center: the top side Lateral/Posterior Rib Cage and Scapulae. Once we get to this level, we should be maintaining the previous positions, which allows us to stay in a bottom side state of AF IR. The summation of the four previous levels and reference centers culminates in one's ability to perceive this Moderate difficulty reference center. At this level, the individual being tested should have at least ten muscles active due to acquisition of three Moderate sensory difficulty and two High sensory difficulty reference centers.

Hruska ABDuction Lift Test:

The advantage of this Test is that the individual being tested should have two of the three Low sensory difficulty reference centers alive (top side Medial Arch and top side Great Toe). The difficulty during this test is twofold: first, we require the individual being tested to lose the two Low sensory difficulty references as we transition to Level 4; and, second, we begin this test by asking them to access to High sensory difficulty references immediately while keeping the two Low sensory difficulty referents active.

Level 1: (bottom side IO/TA for thoracic abduction and top side pelvic depression) As we are asking them to perceive this High difficulty reference center, we are allowing them to use two of the Low difficulty reference centers. As the individual being tested performs top side pelvic depression with the bottom side IO/TA while staying out of sagittal plane extension, they should be aware of this High difficulty reference center.

At any point during this test, placing a pillow under their head to induce cervical lateral flexion towards the top side in an effort to find the Moderate sensory difficulty reference center of the bottom side Molars is permitted, and strongly recommended, from the outset of this test.

This level has the potential for five reference centers (two Low, two Moderate, and one High). As they properly engage the bottom side IO/TA as well as the top side Medial



Arch and Great Toe, pelvic depression is the potential, and desired, result. This movement may result in the presence of the top side Moderate sensory difficulty Lateral/Posterior Rib Cage and Scapulae reference center. This reference center should become more and more obvious to the individual as they progress through this test, and may not be overly felt at Level 1. Finally, adding the bottom side Molars may be required to properly sense and feel the High difficulty bottom side IO/TA.

While engaging all four referents may not be required for the patient/client to be aware of their bottom side IO/TA, it does provide the tester insight as to how difficult it may be for the patient/client to perceive and use High sensory difficulty reference centers. As well as providing an indication as to how valuable and necessary the IO/TA reference center is to the overall performance of upright gait. Additionally, the value of this test is the possibility of four referents available to be used to assist in finding the one High difficulty reference center. The difficulty of this test is that for the remainder of the test, we will be adding High difficulty reference centers and removing Low difficulty referents.

Level 2: (bottom side IC Adductor) While keeping two Low difficulty reference centers, the objective is to keep the High difficulty bottom side IO/TA alive while we add the High difficult reference center of the bottom side Anterior Hip Capsule.

Again, they will possibly need four of the Low and Moderate reference centers as a referent in order to keep the two High sensory difficulty reference centers alive. The top side Lateral/Posterior Rib Cage and Scapulae reference center may become more obvious to the patient/client at this level.

Level 3: (top side FA IR) From this point forward, we will be removing Low difficulty references as we add more reference centers. The Low difficulty referent that has the potential to be lost at this level is the top side Medial Arch. The top side Great Toe can remain in contact with the wall as they perform top side FA IR. The High sensory difficulty reference center added at this juncture is the bottom side Posterior Mediastinum Expansion.

As the top femur is performing FA IR, the top pelvis is rolling from neutral towards AF ER. The result of this position, while maintaining the previous referents and reference centers, is the addition of the bottom side Posterior Mediastinum Expansion sense will be challenging to get and keep. One of these reasons is the potential removal of the Low difficulty reference of the top side Medial Arch. The top side Lateral/Posterior Rib cage and Scapulae have the potential to become significantly more alive as well.

At this level, the potential exists to have one Low sensory difficulty reference center (top side Great Toe), two Moderate sensory difficulty references (top side Lateral/Posterior Rib Cage and Scapulae with the potential of the bottom side Molars),



and all three High sensory difficulty references (bottom side IO/TA, Anterior Hip Capsule, and Posterior Mediastinum Expansion)

Level 4: (Anterior and Posterior Gluteus Medius) If they have not been aware of the top side Lateral/Posterior Rib Cage and Scapulae by this point, they probably will be aware of it at Level 4. As they are working harder on the bottom side, the top side rib cage will need to permit thoracic adduction and expansion during this level. If not, top side FA ABD/IR will not be performed with the Gluteus Medius muscles.

As the patient/client removes the lone remaining Low difficulty reference center (top side Great Toe), their High sensory difficulty references (bottom side IO/TA, Anterior Hip Capsule, and Posterior Mediastinum Expansion) will all be working harder to maintain this position with only two Moderate sensory difficulty reference centers (bottom side Molars, and top side Lateral/Posterior Rib Cage and R scapulae). At this level, the rationale behind using a pillow to perform passive cervical lateral flexion towards the top side in order to induce the bottom side Molars as a referent at the beginning of this test should be apparent.

Level 5: (top side Gluteus Max) The reference being added at this level is the top side Posterior Hip. By this point, there should be zero Low, three Moderate (top side Posterior Hip, top side Lateral/Posterior Rib Cage and Scapulae, and bottom side Molars), and all three of the High (bottom side IO/TA, Anterior Hip Capsule, and Posterior Mediastinum Expansion below T8) sensory difficulty reference centers alive at the same time.

At the conclusion of this test, there is the potential to have six reference centers alive and at least eleven muscles working together. The necessity of proper frontal plane activity during gait and breathing is evident during this activity. This test also highlights the difficulty in performing frontal plane lateralization well, as evidenced by the number of reference centers that were available at Level 1, and then maintained and/or exchanged during the testing process.



PRI Reference Sites (Centers) Low Difficulty

R Medial Arch

L Heel

R Great Toe

PRI Reference Sites (Centers) Moderate Difficulty

L Ischial Tuberosity

R canines/L molars

R Posterior Hip

**R Lateral/Posterior Rib Cage &
R Scapulae (when in L AF IR)**

PRI Reference Sites (Centers) HIGH DIFFICULTY

L IO/TA

L Anterior Hip Capsule

**L Posterior Mediastinum below T8 (High
Difficulty without tactile input)**