



# 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 about 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 PRI Non-Manual Techniques Workshop, may be more difficult for others. Using the ten references outlined in the PRI Non-Manual Techniques Workshop, along with their 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 or sites.

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. *(\*If you are wondering what is considered Low, Moderate or High reference centers, please take the PRI Non-Manual Techniques Workshop to learn more.)*

## **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 not performing a Level 1 with incorrect use of the top leg or permitting the top pelvis to roll 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 the previous level again required a Moderate difficulty reference center. At Level 4, we are adding another 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 all three of the Low sensory difficulty reference centers alive (bottom side Heel, top side Medial Arch, top side Great Toe). The difficulty during this test is twofold: first, we require the individual being tested to lose two of the three Low sensory difficulty references as we transition to Level 4. Second, we begin this test by asking them to access to High sensory difficulty references immediately while keeping the three 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 all three 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.



An additional advantage during this level is they may also be able to achieve a Moderate sensory level reference center, the bottom side Ischial Tuberosity, because of their ability to hold onto the bottom side heel into a surface. The result is the possibility of four reference centers as a referent to find the bottom side IO/TA without sagittal extension. They may need all four referents for this one reference.

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 often times, required.

This level has the potential for seven reference centers (three Low, three Moderate, and one High). As they properly engage the bottom side Heel, Ischial Tuberosity, and 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 seven reference centers 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 there are the possibility of six 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 reference centers.

**Level 2:** (bottom side IC adductor) While keeping all three of the Low difficulty reference centers, the objective is to keep the High difficulty bottom side IO/TA alive while we add the reference center of the bottom side Anterior Hip Capsule. Similar to the previous level, it is possible to have added the bottom side Ischial Tuberosity to all three Low sensory difficulty reference centers.

Again, they will probably need four (possibly six) 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 slightly more alive.

**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 to AF ER. The result of this position, while maintaining the previous referents and reference centers, 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, but the bottom side Heel should remain obvious. The top side Lateral/Posterior Rib cage and Scapulae have the potential to become more alive as well.

At this level, the potential exists to have two Low sensory difficulty reference centers (bottom side Heel and top side Great Toe), two (possibly three) Moderate sensory difficulty references (bottom side Ischial Tuberosity and 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 are removing another Low difficulty reference center (top side Medial Arch), that leaves only one remaining Low difficulty reference center (bottom side Heel). This means that 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 (possibly three) Moderate sensory difficulty reference centers (bottom side Ischial Tuberosity and top side Lateral/Posterior Rib Cage and R scapulae). Adding the bottom side Molars (Moderate difficulty) may be required at this point in order to keep all three High difficulty reference centers alive.

**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 one Low (bottom side Heel), three Moderate (bottom side Ischial Tuberosity, top side Posterior Hip and Lateral/Posterior Rib Cage and Scapulae with the potential of having added the fourth Moderate reference center, 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 has the potential to have eight 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 of 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.