ARTICLE

Influence of Hamstring and Abdominal Muscle Activation on a Positive Ober's Test in People with Lumbopelvic Pain

H. Rich Tenney, PT, DPT; Kyndall L. Boyle, PT, PhD;† Aaron DeBord, PT, DPT**

ABSTRACT

Purpose: To assess the immediate effect of hamstring and abdominal activation on pain levels as measured by the Numeric Pain Scale (NPS) and hip range of motion as measured by Ober's Test in people with lumbopelvic pain. ***Methods:*** Thirteen participants with lumbopelvic pain and positive Ober's Tests completed an exercise developed by the Postural Restoration Institute™ to recruit hamstrings and abdominal muscles. ***Results:*** There was a significant increase in passive hip-adduction angles ($p < 0.01$) and decrease in pain ($p < 0.01$) immediately after the intervention. ***Conclusion:*** Specific exercises that activate hamstrings and abdominal muscles appear to immediately improve Ober's Test measurements and reduce pain as measured by the NPS in people with lumbo-pelvic pain. Hamstring/abdominal activation, rather than iliotibial band stretching, may be an effective intervention for addressing lumbopelvic pain and a positive Ober's Test.

Key Words: hip; iliotibial band syndrome; pelvic pain; Ober's Test; postural balance.

RÉSUMÉ

Objectif : Évaluer l'effet immédiat de l'activation des ischiojambiers et des muscles abdominaux sur le degré de douleur mesuré à l'échelle numérique (EN) de la douleur et sur l'amplitude de mouvement de la hanche mesurée dans le cadre d'un test d'Ober chez les sujets souffrant de douleurs lombo-pelviennes. ***Méthode :*** Un échantillon de 13 participants souffrant de douleurs lombo-pelviennes et ayant un test d'Ober positif ont été soumis à un programme d'exercices conçus par le Postural Restoration Institute™ en vue de redonner leur force aux muscles ischiojambiers et aux muscles abdominaux. ***Résultats :*** Une augmentation considérable de l'angle d'adduction passive de la hanche a été constatée ($p < 0{,}01$) de même qu'une diminution de la douleur ($p < 0{,}01$) immédiatement après l'intervention. ***Conclusion :*** Des exercices spécifiques qui permettent d'activer les muscles ischiojambiers et les muscles abdominaux semblent améliorer immédiatement les mesures obtenues au test d'Ober et réduire la douleur mesurée à l'EN chez les sujets aux prises avec des douleurs lombo-pelviennes. L'activation des abdominaux et des ischiojambiers peut être plus efficace que les étirements de la bande ilio-tibiale pour contrer la douleur lombo-pelvienne et obtenir un test d'Ober positif.

Lumbopelvic pain conditions have been associated with decreased passive hip range of motion (ROM) and increased lumbar lordosis.[1–4] Orthopaedic spine surgeon Frank R. Ober developed Ober's Test in 1937 to assess passive hip-adduction ROM in patients with lumbopelvic pain.[1] Ober discovered that if he surgically excised the tight iliotibial band (ITB) in patients with back pain, passive adduction improved, lordotic curvature of the lumbar spine decreased, and lumbopelvic and sciatic pain was relieved. Ober recognized a correlation between hip ROM and lumbopelvic pain that has been established in recent studies.[5,6] The traditional clinical application of Ober's Test was to assess patients with lumbopelvic conditions, including sciatica; a positive test indicated the need for surgery.

In 1949, Kendall described Ober's Test as a way to determine whether the ITB and/or tensor fasciae latae (TFL) needs passive stretching.[7–12] This description has led to the contemporary use of Ober's Test primarily as an assessment of ITB/TFL length, whereas its original purpose was to assess lumbopelvic position, as described by Ober.[1] It is Kendall's textbooks, published in sub-

From the: *Yavapai Regional Medical Center, Prescott, Ariz; †Appalachian State University, Boone, N.C., USA.

Correspondence to: Kyndall L. Boyle, Physical Therapist, Appalachian State University, Owens Field House, 135 Jack Branch Dr., Boone, NC 28608 USA; boylekl@appstate.edu.

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sequent editions over the past 62 years, that have informed the contemporary clinical reasoning behind when to do the test (if you want to know whether a patient/client has a short ITB/TFL), how to interpret the test (if the leg adducts above horizontal, it is positive; below horizontal, it is negative), and what intervention to prescribe if the test is positive (ITB/TFL stretching).

The use of hamstring activation or hamstring and abdominal activation to influence Ober's Test measurements is a fundamental approach used by the Postural Restoration Institute™ (PRI).[13–15] PRI recognizes that the body is not symmetrical:[14] the neurological, respiratory, circulatory, muscular, and vision systems are not the same on the left side of the body as on the right side. PRI's rationale assumes that these asymmetries can cause imbalances and dysfunctional movement patterns as a result of overuse of one side of the body at the expense of the other.[14] For example, right-side overuse can lead to a tendency to stand more on the right leg, resulting in a positional change to the pelvis: instead of each hemipelvis being in a "neutral" position (not favouring one extreme ROM versus the other), the left hemipelvis is forwardly rotated in the transverse plane and anteriorly tilted in the sagittal plane relative to the right hemipelvis.[3,14–16] Another common dysfunctional movement pattern involves a bilateral anterior tilt of the pelvis associated with overactive back extensors and hip flexor musculature.[14,15,17] A common finding associated with these patterns is a limitation in hip adduction on one or both sides, as measured by Ober's Test. If the pelvis is in an anatomically neutral position, the femur should be able to be moved in the acetabulum during Ober's Test, so that full adduction occurs. If the pelvis is not neutral, however, as in an anterior pelvic tilt, then the acetabulum has moved on the femoral head into a position of hip flexion; when a clinician then performs Ober's Test, a bony block of the inferior cotyloid rim of the acetabulum on the femoral neck may occur, which may limit the overall hip-adduction ROM.

Recent case reports have documented that using hamstring activation or hamstring and abdominal activation can decrease pain and immediately increase passive hip adduction as measured by Ober's Test.[3,4,18] In addition, unpublished research with healthy volunteer participants without pain, presented at a professional meeting, showed that a positive Ober's Test can immediately become negative after the participant performs an exercise that activates the ipsilateral hamstrings.[19] The authors of the presentation proposed that a change in static pelvic position via unilateral hamstrings and/or abdominals explained the test outcomes—that is, a change in the sagittal plane (from anterior tilt to posterior tilt) and/or transverse plane (from forward rotation to neutral rotation). They also documented whether or not the investigator perceived bony block end feels during the abduction/external rotation phase and/or the adduction phase of Ober's Test, both before and after the experimental intervention (a hamstring-activation exercise); bony blocks that were felt before the intervention were not felt after the intervention.[19] The three case reports[3,4,18] and the professional presentation support clinical reasoning that a positive Ober's Test may indicate a lumbopelvic complex that is not in a neutral position. This clinical reasoning would suggest that traditional clinical reasoning regarding Ober's Test (that a positive test indicates short muscle requiring passive stretching) may need to be reconsidered.

The purpose of the present study was to assess the immediate effect of hamstring and abdominal activation on pain levels (measured using the Numeric Pain Scale [NPS]) and ipsilateral hip ROM (measured using Ober's Test) in people with lumbopelvic pain. Our hypotheses were, first, that participants would report a reduction in pain immediately after performing the exercise; and, second, that passive hip-adduction angles would increase following the exercise intervention, as measured by Ober's Test.

METHODS

Participants

Using consecutive sampling over a 2-month period, we recruited 13 participants (10 female, 3 male) with a mean age of 39 (SD 13.5) years (range 18–54 y) who had a positive Ober's Test on one or both lower extremities. For the purposes of this study, and based on mean hip adduction angles (26.4 (SD 4.1)°) found in healthy subjects[20] an adduction angle $\leq 15^\circ$ was considered positive. Participants either had been referred for physical therapy management or were employees of the medical center who volunteered to participate in the study. Five participants presented with pain in the left sacroiliac joint (SIJ) region, two had pain in the right SIJ region, two had diffuse right-sided low back pain (LBP), one had left hip pain, one had right hip pain, and one had left buttock pain. Potential participants were included if they were between 18 and 59 years old and had been experiencing pain for >1 week in the lumbopelvic region (from the first lumbar vertebra distal to the gluteal folds). Those >60 years of age were excluded, to avoid the influence of degenerative changes, as were those with a history of lumbopelvic surgery.

Procedures

The study protocol was approved by the Institutional Review Board of Yavapai Regional Medical Center, and all participants provided written informed consent before beginning the study. All activities related to the study occurred in the Yavapai Regional Medical Center outpatient clinic.

Participants were asked to rate their current level of pain using the NPS,[21] that is, to rate their pain from 0 (no pain) to 10 (the greatest amount of pain) during a comparable sign (i.e., painful activity) that was reproduced in the clinic. The comparable sign was selected by each participant as one that typically caused the most pain and could be reproduced within 1 minute, such as bending over, sitting, or walking.

The first examiner then performed Ober's Test. The test is done with the patient positioned in side-lying with hips and knees flexed, aligning the shoulders with the hips and ankles, with the legs stacked on top of each other. The clinician then holds the patient's top leg with the forearm in supination, supporting the lower leg and knee (90°), while his or her other hand stabilizes the pelvis. Finally, the clinician takes the leg back into hip external rotation and extends to 0°, then allows the leg to passively adduct from a position of neutral hip extension and rotation, without allowing pelvis motion and maintaining the femur in neutral.[12] We used a Baseline Bubble Inclinometer (Fabrication Enterprises Inc., White Plains, NY) to measure the adduction angle; the use of an inclinometer has been shown to be a reliable way to measure adduction angles during Ober's Test.[22] A solid base made from heavy cardboard was attached to a strap that was secured to the participant's tested leg, and the inclinometer rested on the base. The second examiner stabilized the inclinometer on the base as the measurement was taken. Results were recorded by the second examiner; the first examiner was blinded to the results of the test. Both examiners had four years' extensive experience using Ober's Test on patients at the time of the study.

If Ober's Test was positive on both sides, indicating a bilateral anteriorly rotated pelvic position, the second examiner instructed the participant in an exercise that recruits bilateral hamstrings and abdominals (90/90 Hip Lift with Balloon; see Figure 1).[23] The name of the exercise reflects the 90° hip and knee flexion and the hip lifting that occurs as a result of hip extension from hamstring activation, which moves the acetabulum (A) on the femur (F), or *AF extension*. If Ober's Test was positive on one side only, the participant was instructed in an exercise that recruits the ipsilateral hamstrings (90/90 Hemibridge with Balloon; see Figure 2). Both groups used a balloon to recruit the abdominal muscles, as described in the literature.[23] Each participant performed five repetitions of the appropriate exercise, after which Ober's Test was measured and recorded again in the same manner. Approximately 15 minutes passed between exercise performance and post-intervention testing. The participant then repeated his or her individual comparable sign, and a post-intervention NPS score was collected by the second examiner.

Statistical Analysis

Statistical analysis was performed using the Statistical Package for the Social Sciences, version 17.0 (SPSS Inc, Chicago, IL). The alpha level was set a priori at 0.05. We compared and analyzed the absolute pre–post changes in passive hip ROM and pain level as measured by the NPS using a paired t-test. Observed effect sizes were calculated using Cohen's d (difference in means divided by estimated SD), using Cohen's classification of effect sizes as small (0.2–0.4), medium (0.5–0.7), and large ($\geq$0.8).

Figure 1 90/90 hip lift with balloon.

Instructions:

1. Lie on your back with your feet flat on a wall and your knees and hips bent at a 90° angle.
2. Place a 4–6″ ball between your knees.
3. Place your right arm above your head and a balloon in your left hand.
4. Inhale through your nose and as you exhale through your mouth perform a pelvic tilt so that your tailbone is raised slightly off the mat. Keep your low back flat on the mat. Do not press your feet flat into the wall; instead, dig down with your heels.
5. Shift your left knee down so that it is below the level of your right without moving your feet. You should feel your left inner thigh engage.
6. With your left knee shifted down, take your right foot off the wall. You should feel the back of your left thigh engage. Maintain this position for the remainder of the exercise.
7. Now inhale through your nose and slowly blow out into the balloon.
8. Pause 3 seconds with your tongue on the roof of your mouth to prevent airflow out of the balloon.
9. Without pinching the neck of the balloon, and keeping your tongue on the roof of your mouth, inhale again through your nose.
10. Slowly blow out as you stabilize the balloon with your hand.
11. Do not strain your neck or cheeks as you blow.
12. After the fourth breath in, pinch the balloon neck and remove it from your mouth. Let the air out of the balloon.
13. Relax and repeat the sequence 4 more times.

RESULTS

The left-hip frontal plane motion ranged from 9° abduction to 14° adduction before intervention. The mean change in left hip adduction was 19° (SD 3°) after the intervention ($p < 0.0001$), whereas the change in right hip adduction was negligible (mean change 0.8° (SD 1°), $p = 0.52$). NPS level pre-intervention ranged from 2/10

Figure 2 90/90 hemibridge with balloon.

Instructions:

1. Lie on your back with your feet flat on a wall and your knees and hips bent at a 90° angle.
2. Place a 4–6″ ball between your knees.
3. Place your right arm above your head and a balloon in your left hand.
4. Inhale through your nose and as you exhale through your mouth perform a pelvic tilt so that your tailbone is raised slightly off the mat. Keep your low back flat on the mat. Do not press your feet flat into the wall; instead, dig down with your heels.
5. Take your right foot off the wall. You should feel the back of your left thigh engage. Maintain this position for the remainder of the exercise.
6. Now inhale through your nose and slowly blow out into the balloon.
7. Pause 3 seconds with your tongue on the roof of your mouth to prevent airflow out of the balloon.
8. Without pinching the neck of the balloon and keeping your tongue on the roof of your mouth, inhale again through your nose.
9. Slowly blow out as you stabilize the balloon with your hand.
10. Do not strain your neck or cheeks as you blow.
11. After the fourth breath in, pinch the balloon neck and remove it from your mouth. Let the air out of the balloon.
12. Relax and repeat the sequence 4 more times.

to 7/10 (mean 4.2/10); the mean change in NPS level after intervention was 2.5 points ($p = 0.0005$; see Table 1).

A post hoc power analysis shows that this experiment had 100% power to detect a mean difference of ≥10° with a two-tailed paired t-test ($\alpha = 0.05$) for both left and right hip-adduction angles as measured by Ober's Test, and 99% power to detect a change of ≥2.5 points in pain level. The power analysis was calculated using the SD of the change in left hip adduction, right hip adduction, and pain level based on 13 participants. The observed effect sizes, using Cohen's d, were 4.09 for left hip adduction (large) and 0.19 for right hip adduction (small); the effect size for pain was large at 1.32.

DISCUSSION

Our findings demonstrate how an exercise that recruits hamstring and abdominal muscles can immediately influence Ober's Test measurements and self-reported pain level in people seeking physical therapy for lumbopelvic pain. All participants showed a significant increase in hip ROM of the affected leg(s), as assessed with Ober's Test, after performing the appropriate 90/90 exercise (either 90/90 Hip Lift with Balloon or 90/90 Hemibridge with Balloon).

The 90/90 Hemibridge with Balloon exercise activates the hamstrings unilaterally (because there is only one foot on the wall), whereas the 90/90 Hip Lift with Balloon activates the hamstrings bilaterally (because both feet are on the wall). In a person with a forwardly rotated pelvis in the transverse plane and an anterior tilt in the sagittal plane, unilateral hamstring activation should rotate the pelvis in a posterior direction via the pull of the ipsilateral hamstring on the ischial tuberosity (i.e., a hip extension or AF extension). Ipsilateral posterior pelvic tilt via hamstring activation also helps decrease lumbar lordosis and increase ipsilateral anterior rib depression / internal rotation, and may increase intra-abdominal pressure (IAP);[23] abdominal activation via balloon blow assists in achieving a posterior pelvic tilt (decreased anterior pelvic tilt), lumbar flexion (decreased lumbar lordosis), and rib depression / internal rotation (decreased rib elevation / external rotation) and may increase IAP. Once the pelvis is in a neutral position, the femoral head should be free to adduct without abutting the cotyloid rim of the acetabulum. The observed increase in hip adduction and reduction in lumbopelvic pain may therefore have resulted from a change in pelvic–femoral position.

Contemporary clinical reasoning for Ober's Test has not considered the static position of the lumbopelvic osseous structures or the tonicity of musculature such

Table 1 Range of Motion of Passive Hip Adduction and Pain Level before and after Hamstring/Abdominal Activation with a 90/90 Balloon Exercise

	Value; mean (SD)			
Measurement	Pre	Post	Mean (SD) difference post–pre	p-value
Left HA angle, degrees	0.2 (6.3)	19.8 (3.0)	19.7 (4.8)	<0.0001
Right HA angle, degrees	21.5 (4.8)	22.3 (3.5)	0.8 (4.2)	0.52
NPS level	4.2 (1.5)	1.7 (1.5)	−2.5 (1.9)	0.0005

HA = hip adduction; NPS = Numeric Pain Scale

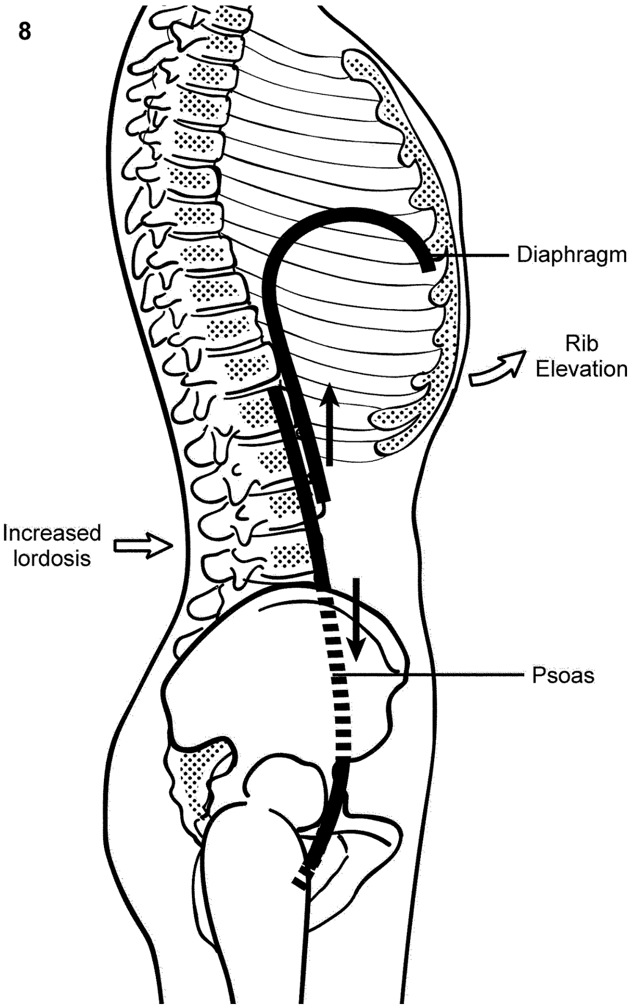

Figure 3 Relationship of overactive psoas and diaphragm on the spine (increased lordosis) and pelvis (hip flexion / anterior pelvic tilt).

as hip flexors or back extensors. For example, whether or not the pelvis is anteriorly tilted on the femur and/or forwardly rotated on the femur has not been considered. If the hip joint is not in neutral, then the position of the acetabulum over the femoral head is not neutral, which may influence the results of Ober's Test. Overactive muscles such as hip flexors and diaphragm may interfere with a person's ability to get into the described neutral hip-extension position so that hip-adduction motion can be assessed (see Figure 3).

There was a significant decrease in reported pain levels when participants reproduced their comparable signs after performing the 90/90 Hip Lift with Balloon or 90/90 Hemibridge with Balloon exercise. Mean NPS score was reduced by 2.5 points, equivalent to the minimal clinically important difference (MCID).[21] This reduction may be attributed to a repositioning of the pelvis to a more neutral position, which would relieve stress and/or strain on muscles, joints, and ligaments associated with musculoskeletal pain patterns such as sciatica, LBP, sacroiliac join pain (SIJP), and thoracic outlet syndrome (TOS).[8–10]

All but one participant reported a decrease in pain immediately after performing the hamstring/abdominal exercise. The one participant who reported increased pain was later found to have a history of acute proximal hamstring strain prior to the study. She may have experienced pain because she could not tolerate her painful activity (sitting) because of increased pressure on the irritated muscle or because activation of the previously strained hamstring muscle during the exercise caused further irritation.

Our results suggest that hamstring and abdominal activation can be beneficial in immediately reducing lumbopelvic pain (as measured by NPS) and improving Ober's Test measurements. The contemporary clinical reasoning whereby a positive Ober's Test indicates short TFL/ITB, and therefore requires passive stretching to lengthen the soft tissue, is thus called into question.

Our findings in this study are consistent with those of three case reports in which hamstring and abdominal activation with a 90/90 Hemibridge and Balloon or hamstring activation with a 90/90 Hemibridge without Balloon were used to manage patients with bilateral TOS,[17] right LBP and right sciatica,[18] or left LBP and left SIJP.[3] Two of the case reports documented an immediate change from a positive to a negative Ober's Test after hamstring activation using a 90/90 Hemibridge exercise.[3,18] Since neither the TFL muscle nor the ITB was stretched, a plausible explanation for the change in hip-adduction angle is a change in the static position of the pelvis following the exercises. During a positive Ober's Test, when the tested leg is brought into neutral hip extension and then adducted, if the pelvis is in a state of anterior tilt in the sagittal plane and in a state of forward rotation in the transverse plane,[24] the neck of the femur may impinge on the cotyloid rim of the acetabulum, preventing normal adduction ROM as a result of bony abutment. This situation would produce a hard end feel. The 90/90 Hip Lift with Balloon exercise engages the hamstrings and abdominal muscles to move the pelvis into a posterior pelvic tilt and the hip(s) into hip extension (acetabulum on femur).[23] This would reposition the pelvis from an anterior tilted state in the sagittal plane toward neutral.

In the case reports, pain levels were reported using either the Northwick Park Neck Pain Questionnaire (NPNPQ)[25] or the NPS. All three case reports documented a significant improvement in pain scores (from 55.5% initial to 0% at discharge[17] or from 9/10 or 8/10 initial to 0/10 at discharge[3,18]). In these cases, the MCID (5% for NPNPQ,[26] 2.5 points for NPS[21]) was exceeded. The hamstring-activation 90/90 exercise prescribed for the patients in these case reports, however, was only one of seven, eight, or nine exercises prescribed, and therefore we cannot know how much each exercise contributed to the reduction in patients' reported pain.

In the present study, 13 of 13 participants had a positive Ober's Test on the left; only 1 also had a positive Ober's Test on the right. This suggests that the left hemipelvis is more likely than the right hemipelvis to become positioned in a state of anterior rotation in the sagittal plane and forward rotation in the transverse plane. This pelvic position complements the inherent vertebral rotation pattern of lumbar/thoracic vertebrae (L5–T5) rotating right while upper thoracic vertebrae (T3–T4) rotate back to the left.[27] It has been theorized that this pattern is related to the placement of the liver and heart, a hypothesis further substantiated by subsequent research documenting the opposite pattern in people born with their organ position reversed from the typical position (the phenomenon known as situs inversus totalis).[28] These patterns of asymmetry appear to be predictable and associated with internal organ position.

The PRI suggests that this predictable pattern of asymmetry is also associated with a polyarticular chain of muscles located on the left and right sides of the interior thoraco-abdominal pelvic cavity, known as the anterior interior chain (AIC). The AIC consists of the diaphragm and psoas muscles; each chain is supported by the iliacus, TFL, biceps femoris, and vastus lateralis muscles on the left or right side. The chains become more or less active based on dominant tendencies (e.g., spending more time with weight shifted over one extremity) and anatomic asymmetries. When a person has increased muscle tone through the left AIC, the pull of these muscles will rotate and tilt the left hemipelvis forward and anteriorly, which will increase lumbar lordosis and rotate the lumbar and lower thoracic vertebrae to the right. The upper thoracic vertebrae then rotate back to the left to compensate for the lower vertebral rotation. In addition, the left lower anterior ribs move into a more elevated and externally rotated position, which produces increased torque and may lead to lumbopelvic pain. This upper thoracic rotation to the left limits the left abdominal muscles' ability to maintain a zone of apposition (ZOA) of the left hemidiaphragm.

The ZOA is the portion of the diaphragm that is directly apposed to the inner aspect of the lower rib cage (see Figure 4).[29–31] With a suboptimal left ZOA, the left hemidiaphragm is placed in a more linear or flattened position, which decreases its ability to function as a respiratory muscle.[32,33] In this more linear position, the left hemidiaphragm may function more as a spinal stabilizer,[34] in conjunction with the left psoas in the left AIC. Abdominals oppose the diaphragm and help to pull the ribs down into internal rotation, which helps to maintain an optimal ZOA.

The 90/90 exercises described in this study are used to reciprocally inhibit left AIC tone via left abdominal and hamstring activation, to increase the left ZOA, and

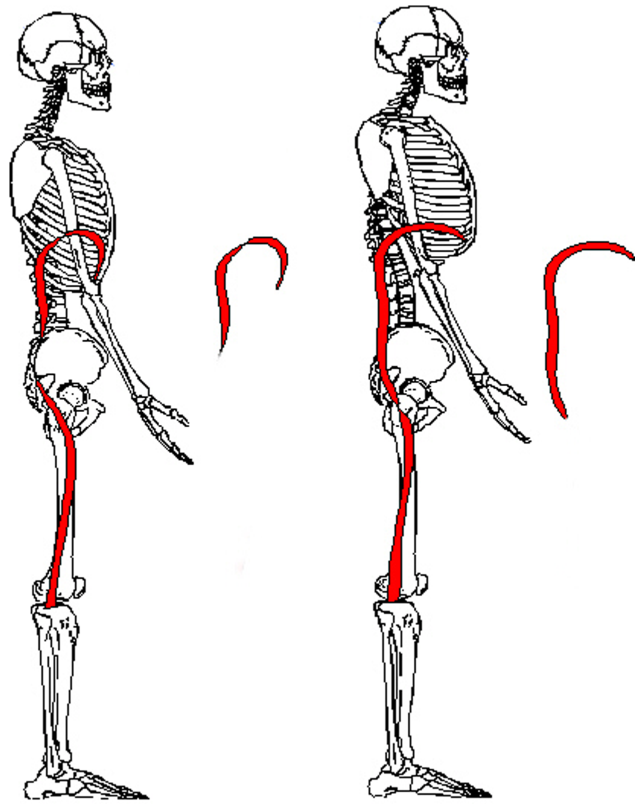

Figure 4 Optimal zone of apposition (left) and suboptimal zone of apposition (right).

to rotate the pelvis posteriorly in the sagittal and transverse plane, into a more neutral position.[17,23] Hamstrings extend the hip, and therefore reciprocally inhibit hip flexors. Hamstrings and abdominals also aid in inhibiting paraspinal muscles via a posterior pelvic tilt / hip extension, a decrease in lumbar extension, and an increase in lumbar flexion. This more neutral pelvic position would decrease pain associated with torque in the lumbopelvic complex and allow the femur to adduct on the acetabulum without restriction, producing a negative Ober's Test.[3,18] This change in ROM as measured by Ober's Test is a result of bony position changes rather than of stretching tight/short muscles.

Further research to compare hamstring and abdominal activation exercises to ITB stretching exercises or placebo for patients with pain and positive Ober's Tests (decreased hip adduction) is warranted, as is research to investigate the long-term effects of hamstring/abdominal activation exercises on hip adduction and pain levels.

Our study has several limitations. First, our results have external validity for patients with lumbopelvic pain conditions such as SIJ, LBP, hip, and buttock pain, but people with knee pain and other conditions were not sampled. Second, the study design did not include a comparison group receiving an alternative intervention, no intervention, or a placebo.

CONCLUSION

People with lumbopelvic pain and a reduction in passive hip adduction as measured by Ober's Test may be able to improve their Ober's Test measurements and decrease their pain by activating their hamstrings and abdominals using an exercise called a 90/90 Hip Lift with Balloon (if Ober's Test is positive bilaterally) or 90/90 Hemibridge with Balloon (if Ober's Test is positive unilaterally). Our findings provide support for clinical reasoning to include hamstring/abdominal activation in addressing limited hip adduction (positive Ober's Test), whereas current clinical reasoning includes only passive ITB/TFL stretching.

KEY MESSAGES

What is already known on this topic

Lumbopelvic pain and limited passive hip-adduction range of motion (ROM), as measured by Ober's Test, may be relieved with surgery. The traditional clinical reasoning for patients presenting with lumbopelvic pain and a positive Ober's Test was that surgery is indicated; common contemporary clinical reasoning for these patients is that they require iliotibial band stretching. It is not widely known that hamstring or hamstring and abdominal activation exercises may be beneficial in improving Ober's Test measurements and reducing lumbopelvic pain. Three case reports published over the past 8 years have discussed the use of hamstring/abdominal exercises for this patient group and proposed that Ober's Test may reflect triplanar position of the pelvis/hip joints, which may change with hamstring and abdominal muscle activation.

What this study adds

Hamstring and abdominal activation appears to immediately improve hip-adduction passive ROM, as measured by Ober's Test, and to decrease pain, as measured by the Numeric Pain Scale, for people with lumbopelvic pain. The study introduces unique exercises to address lumbopelvic pain associated with limited hip-adduction ROM. Immediate changes in hip adduction as measured by Ober's Test cannot be attributed to changes in muscle length (sarcomeres being laid down in series). Contemporary clinical reasoning that sees Ober's Test as reflecting shortness/tightness of the iliotibial band or tensor fasciae latae warrants further investigation.

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