TEST ONE

STANDING ON ONE FOOT / HIP DROP

MEASURES
TFL-ITB length and Gluteal recruitment patterns

PERFORMING
Subject lifts one foot off the floor, keeping support leg straight and lifted leg slightly bent. Ideal range of drop of the pelvis on the leg off the floor side is 3-6 cm

SHORTENED
If pelvic drop is < 3cm

LENGTHENED
If pelvic drop is > 6cm

EXPLANATION
1. Pelvic tilt associated with anterior tilt – elongated hip flexors with increased range motion in hip flexion
2. Normal to excessive drop associated with pelvic rotation/excessive medial rotation of supporting hip – elongated external rotators and increased range of motion in medial rotation
3. Pelvic drop associated with posterior tilt – elongated hip flexors with increased range of movement in hip extension

PROPRIOCEPTION
Observe
1. Shoulder level
2. Pelvis level
3. Eyes open & Eyes closed

With eyes closed, increased difficulty with maintaining the natural assumed position indicates poor proprioceptive feedback from Gluteus maximus in weight bearing. With eyes closed, increased difficulty with maintaining neutral hips and externally rotated hip indicates poor proprioceptive feedback from Gluteus medius in weight bearing

PATTERN OF MOVEMENT
Compare pattern of movement for quality of movement and determine movement pattern faults.

TEST TWO

STANDING FORWARD BEND TRUNK CURL

MEASURES
Back extensors, Gluteus maximus, Hamstrings, Gastrocnemius and Soleus length

PERFORMING
Subject starts in normal standing posture and slowly bends forward from the hip trying to move hands towards the floor. Chin tucked to chest and knees remain as straight as possible throughout the movement.

SHORTENED
The subject's back will shift posteriorly during the forward bending by more than 5 cm. Subject's pelvic tilt will remain less than 70° at final position.

LENGTHENED
The subject's pelvic tilt will achieve a greater than normal anterior (> 95°) tilt and deeper hip flexion in final position

EXPLANATION
1. If the body shifts posteriorly this indicates a shortness in Back extensors, Gluteus maximus, Gastrocnemius and Soleus muscles are shortened
2. If there is posterior tilt of less than 70° this indicates short hamstrings
3. Excessive anterior tilt of more than 95° this indicates long hamstrings and glutes and overactive erector spinae.

RELATIVE FLEXIBILITY
Observe
1. Amount of movement between lumbar spine and hip joint
2. Amount of movement between lumbar spine and thoracic spine

PATTERN OF MOVEMENT
Observe
1. Relative timing of movements with one part leading the initiation of movement much sooner or later than another segment
2. On return subject should lead the movement with a posterior tilt.
3. Abnormal movement is indicated when extension leads with lumbar extension due to overactive dominant back extensors
TEST THREE

STRAIGHT LEG SUPINE TRUNK CURL

MEASURES
Length of back extensors of the spine and strength of abdominals compared to hip flexors

PERFORMING
Start supine with legs extended and arms crossed over chest. Attempt to curl from the trunk first then flex at the hip towards achieving a full straight leg situp.

SHORTENED
The subject will be unable to segmentally flex the spine throughout the trunk curl

POSITIONAL STRENGTH – 100%
The subject is able to hold the trunk fully flexed throughout the situp movement.

WEAKNESS
The subject will be unable to achieve a full situp position

EXPLANATION
1. Being unable to segmentally flex the spine through out the trunk curl indicates shortened back extensors or stiff spinal segments
2. Being unable to begin the situp with pelvis and lumbar spine held in neutral position or having to flex the hip early in the movement indicates short hip flexors and or lower back extensors
3. Being able to hold the trunk fully flexed throughout the situp movement indicates normal rectus abdominis and obliques strength
4. Being unable to achieve a full situp position indicates weak abdominal muscles

RELATIVE FLEXIBILITY
Observe
1. Amount of flexion of the Lumbar spine in relation to thoracic spine
2. Amount of movement occurring in lumbar flexion before hip flexion

PATTERN OF MOVEMENT
Observe
1. Performing the hip flexion phase before the trunk curl is completed indicates over dominant hip flexors
2. Being unable to maintain posterior tilt throughout movement indicates weak abdominals
3. If the subjects feet lift off the floor during the movement indicates dominant hip flexors and or tight back extensors

TEST FOUR

LATERAL FLEXION

MEASURES
The length of Quadratus Lumborum on the contralateral side

PERFORMING
Stand with feet evenly spread 8-10 cm. Bend from the waist to the side keeping trunk facing original position and preventing trunk rotation as it flexes laterally

SHORTENED
1. if there is a marked lateral shift of the pelvis away from the movement direction to keep the centre of gravity over the base of support of more than 3cm
2. if the pelvis tilts laterally to the same side as the direction of the movement and there is an associated weight shift onto the leg on the movement side

RELATIVE FLEXIBILITY
Observe the amount of movement in the thoracic and lumbar spines with the timing of the lateral flexion to the movement of the pelvis
1. if lumbar spine moves into flexion to allow lateral flexion
2. if lumbar spine moves into extension or pelvis sways forwards to allow lateral flexion
3. if pelvis rotates to allow lateral flexion
   a. rotation forwards of the ipsilateral pelvis is often associated with extension /sway
   b. rotation backwards of the ipsilateral pelvis is often associated with flexion

PATTERN OF MOVEMENT
Observe
1. if the lateral movement of the trunk is initiated by a lateral shift or tilt of the pelvis i.e. the pelvis moving underneath the trunk instead of the trunk moving off the pelvis
2. The contralateral erector spinae should not excessively contract eccentrically to control the movement into lateral flexion but should activate concentrically to return the trunk to its normal position

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TEST FIVE

BENT KNEE FALLOUT/IN

MEASURES
The range of movement possible at the hip in a hip flexed, abducted and laterally rotated position and the ability of the abdominal muscles in limiting associated rotation of the pelvis.

PERFORMING
Subject’s starts supine on a firm surface with knees bent towards trunk and feet flat on the floor approx 20cm from the hips. The subject then slowly allows the bent leg to fall out to the side whilst maintaining a flat pelvic position on the surface. i.e. limiting pelvic rotation

NORMAL LENGTH
The subject should be able allow the bent leg to fall out to approx 50-60° without associated pelvic rotation or movement of the trunk

SHORTENED
The muscles of the inner thigh will be short if the subject is unable to achieve a normal range of motion in the fall out position and the subject may feel tightness in the inner thigh region

WEAKNESS
Weak obliques will show up by an inability to maintain a still pelvis whilst performing the movement and the subject may achieve the range but with continual adjustment in the pelvis position.

PATTERN OF MOVEMENT
Observe the control of the movement. The movement should be smooth and not jerky or moved in stages. The subject may be unable to relax the muscle enough to allow the movement to occur smoothly.

TEST SIX

LOWER ABDOMINAL STRENGTH TEST ??????
(not sure of level of difficulty and suitability to research)

MEASURES
The strength of the lower abdominal muscles to flex the lumbar spine by flattening the lower back and holding it flat against the gradually increasing resistance provided by the leg lowering movement

PERFORMING
Starts supine on a flat surface with arms crossed over chest, tilt the pelvis posteriorly flatten the lower back on the table by contracting the abdominal muscles and hold it flat whilst lowering both straight legs to the floor from a vertical position

NORMAL
The subject is able to keep the lower back flat on the surface while lowering the legs to the level of the surface.
60° angle achieved in lowering considered fair
30° angle achieved in lowering considered good

EXPLANATION
The angle is measured from the moment the subject’s pelvis starts to tilt anteriorly and the low arches away from the floor

PATTERN OF MOVEMENT
Observe changes in pelvis tilt angle and maintenance of the extended knees. Any changes in these will indicate weakness of the lower abdominals from that angle.

A subject with strong hip flexors can hold the lower extremity in a fixed angle to the pelvis and lower them slowly but at the detriment to the lower back remaining in contact with surface. The weight of the lower extremity overcomes the force produced by the obliques and Rectus Abdominis and attempts to pull the pelvis into a posterior tilt position.
PELVIC GIRDLE MOVEMENT TESTS

TEST SEVEN

PRONE TRUNK EXTENSION

MEASURES
The strength of the hip and trunk extensors in raising the trunk into extension from a prone position

PERFORMING
Subject starts in prone position with hands held together behind the head. Researcher holds both the subjects legs together on the surface and held straight. The subject then attempts to raise their trunk off the surface in a smooth even trunk extension motion

NORMAL
The subject will be able to raise the trunk by simultaneous extension of the hip and lumbar spine in an even motion

EXPLANATION
For back extensors to raise the trunk from this prone position the hip extensors must fix the pelvis in extension and the lumbar extensors must pull from the fixed pelvis to achieve extension. The movement must appear as one movement and not separate movements
Weak extensors can normally be determined by the researcher assisting the subject into full extension. If the subject is unable to maintain this extended position the trunk extensors are indicating a weakness
Bilateral weakness of the back extensors in a standing position is indicated by a lumbar kyphosis and increased thoracic kyphosis. Unilateral weakness results in a lateral curvature towards the weak side
Bilateral contracture of the lower back extensors in a standing position is indicated is indicated by and increased lumbar lordosis. Unilateral contracture results in a scoliosis towards the opposite side of the contracture

PATTERN OF MOVEMENT
Observe patterns of movement such as
1. trunk extending only – indicates strong back extensors and weak hip extensors. The spine can be hyperextended but the trunk cannot be lifted high from the surface
2. fixed pelvis only – indicates strong hip extensors and weak trunk extensors. The hip extensors fix the pelvis and the pelvis tilts posteriorly but he lumbar spine flexes