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PREVENTION & REHABILITATION: SCREENING

Assessing and correcting the middle crossed syndrome

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In the accompanying editorial a novel description of what might be termed the "middle crossed syndrome" is described — akin to Janda's (1979) nomenclature for the muscle imbalance syndromes that he had observed. Janda's descriptions essentially described imbalance in the sagittal plane, while the middle crossed syndrome descriptor refers to imbalance in the transverse plane musculature.

In this practical paper, three screening tests are described that may help to identify this imbalance, and suggestions are made to help with corrective measures.

Gait analysis

Assessing gait can be challenging and often is focused closely on the foot. However, assessment of the trunk in gait can inform the bodyworker and movement therapist of how loads are transferred through the entire kinetic chain — both in an ascending and in a descending fashion.

Since the legs act to amplify motion at the trunk on the swing side, and to transfer ground reaction forces into the trunk on the stance side (Gracovetsky, 1988), any asymmetrical deviation of the umbilicus from central is an indication of imbalance, inefficiency and potential therefore for decreased performance and increased injury risk.

Most commonly it is observed that when standing on the "dominant" leg (ie the kicking leg) the umbilicus will deviate to the left. In other words, the trunk goes into a relative left axial rotation in the transverse plane.

When this is observed, it is of course important to consider all aspects of the kinetic chain that could produce this finding. To combine this assessment with additional screens of the sling systems is therefore prudent, and if a pattern of findings is observed, then the requirement to address the finding increases proportionally.

Two additional tests are described below:

Supine lateral ball roll

The supine lateral ball roll can be used as a simple clinical screening for multi-planar motor control (Figure 1).

Laying supine with his or her back on the Swiss ball, and feet on the ground, the client moves off to one side, keeping the arms parallel to the ground at all times — like the wings of a plane. As the patient moves leftward to the

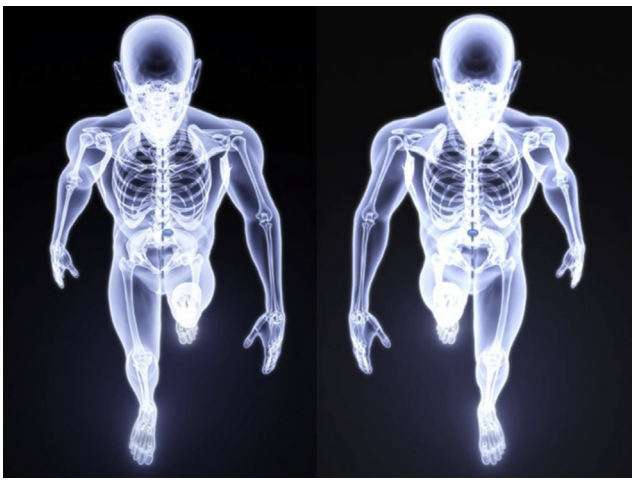

Figure 1 Walking gait. When loading the right leg, a weak or inhibited anterior oblique sling from the right hip to the left shoulder may result in umbilical deviation to the patient's left side.

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Box 1

The traditional model of gait analysis has been to view the human body as a skyscraper whose foundations may be flawed. Hence the solution has been to look at ways to "relay the foundations" through use of orthotic devices. However, this is a very passive model of human function and doesn't take into account the neural and active components of gait mechanics. When such components are considered, it becomes clear that a foot which over-pronates, or under-pronates is not due to an orthotics deficiency (something missing from the foot), but is due to a lack of control through the structures of the foot. The orthotics paradigm arose before the motor control paradigm; and now the concept of motor control is finally making its way down from the trunk to the foot. In addition, it becomes clear when looking at the musculature of the foot that it is poorly suited to controlling the significant loading associated with activities such as running gait, jumping or turning; these activities load the foot with multiples of bodyweight (hundreds of kilograms) so tiny muscles such as lumbricales, interossei, or the flexor hallucis brevis muscles, each with little more flesh than a chicken wing, are hardly likely to be able to control such loads on their own.
And this is why in the design of animal limbs the bulk of muscle mass is always found at the hip, with slightly less in the thigh, less again in the lower leg, and only marginal muscle mass at the foot. This arrangement allows both for larger muscles situated closer to the great mass of the trunk to be engaged, controlling the descent from the swing or flight phase of gait; and also means that, as a lever designed to amplify movement of the trunk, the greater mass of the legs is located proximally, and less distally.

side of the ball, the loading moves toward the left leg and the right shoulder supporting the bodyweight through the ball. This motion therefore loads the posterior oblique sling from left hip to right shoulder; but also the opposing anterior oblique sling from right hip to left shoulder; as gravity attempts to drop the unsupported left shoulder, and less-loaded right hip, backward toward the ground (See Figure 2). This often results in the umbilicus moving to the right (relative to the sternum) (Figure 3, Figure 4).

Interpretation of this finding is that either the left shoulder to right hip anterior oblique sling is weak, inhibited or deconditioned, or the left shoulder right hip posterior oblique sling (gluteus maximus) is weak, inhibited or deconditioned. This can be further evaluated by utilizing the tests described below.

Active straight leg raise (ASLR)

The ASLR was devised and popularized by Diane Lee (1998) to assess for stabilization of the sacroiliac joints. In distinction from the traditional straight leg raise which is a passive test (the practitioner lifting the patient's leg), the ASLR requires the patient to lift the leg and to pay attention to any symptoms that arise, as well as the effort required to lift the leg. The practitioner observes for technique and for range of motion achieved. In the conventional test, the practitioner then mimics the role of several different stability mechanisms while the practitioner and patient pay attention to differences in range of motion, pain, effort to see if any of the interventions alter any of these factors. Frequently it is observed that one or more of these factors changes as a result of the practitioner mimicking one of the stability mechanisms with their hands (Mens et al., 1999). This is indicative of decreased activation of that muscle group and a rehabilitation program is designed based on the outcome.

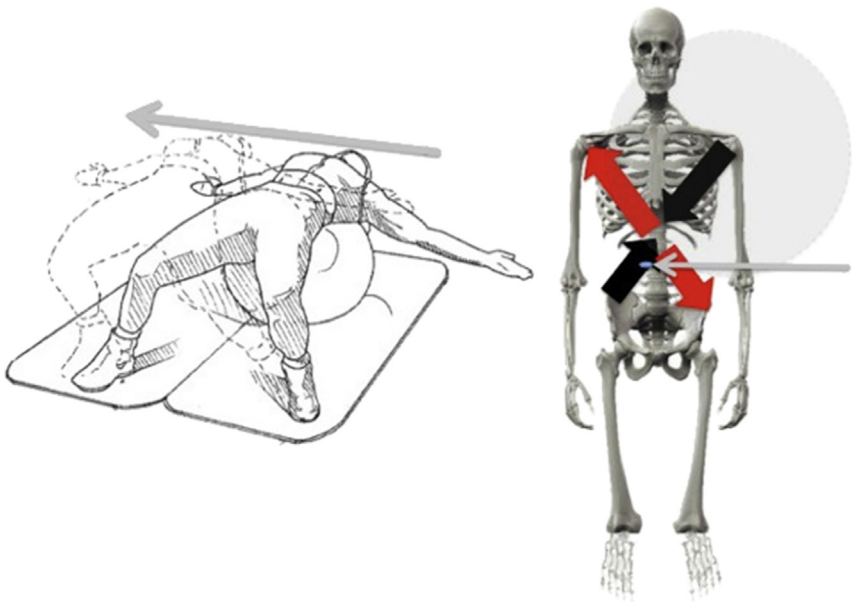

Figure 2 Supine lateral ball roll. As the patient moved out to the right side on the Swiss ball, the right shoulder becomes unsupported and the anterior oblique sling from right shoulder to left hip becomes loaded. If this sling is weak or inhibited (or if the posterior oblique sling from right shoulder to left hip is weak or inhibited) the umbilicus may deviate to the patient's right side (left image© Paul Chek).