## Evidence of muscular dysfunction and increased injury

Skeletal muscle development and maintenance is vital to ensure optimal health and well-being across the life span of all individuals. Skeletal muscle tissue accounts for a significant amount of overall body mass and supports freedom of movement within the environment. In addition to the increased risk and occurrence of chronic diseases, too much sitting and physical inactivity can also cause dysfunction in our body’s muscular and skeletal systems, which can lead to an increased risk of injury and instances of low-back, shoulder, and neck pain (Law & Sluka, 2017; Owen et al., 2010; Thorp et al., 2011).

**Foot and ankle dysfunction**

Foot and ankle injuries can severely limit and impact normal activities of daily living (Chinn & Hertel, 2010). Two of the most common issues at the foot and ankle complex include ankle sprains and plantar fasciitis. An ankle sprain occurs when a person’s ankle is rolled, twisted, or turned, which results in the stretching or tearing of the ligaments that hold the bones of the ankle together and connect it to the foot and the lower leg. Plantar fasciitis involves inflammation of the tissue on the bottom of the foot that connects the heel bone to the toes (i.e., the plantar fascia) and often results in chronic heel pain.

The feet and ankles support the entire body; as a result, impairments to the foot and ankle complex may cause dysfunction to other regions of the body such as the knees, hips, or lower back (Menz et al., 2013; Riskowski et al., 2013). Additionally, if someone has previously injured their ankle, there is a far greater risk of injuring it again if work has not been done to properly condition it back to a strong and stable place (Fulton et al., 2014). This makes it highly important for fitness professionals to monitor the posture of their clients’ feet and ankles during exercise so they can better develop proper movement patterns.

**Knee dysfunction**

Knee pain is a common complaint that can affect anyone regardless of age or level of physical activity. Possible causes of knee pain include arthritis, acute (sudden onset) injuries, and overuse (repetitive) injuries. Arguably, three of the most common knee injuries include patellar tendonitis, anterior cruciate ligament (ACL) tears, and medial collateral ligament (MCL) tears. Some forms of chronic knee pain are also associated with being overweight or obese and a lack of regular physical activity (Frilander et al., 2016).

It is important for fitness professionals to have a basic understanding of proper knee alignment and posture, as well as ways to monitor exercise technique to minimize the risk of injury. Many common types of knee injuries and disorders can be prevented with proper exercise technique, supportive footwear, and modifications to exercise and physical activity as necessary. Regular flexibility and strength training plans with the inclusion of a comprehensive warm-up component can help significantly reduce the incidence of knee injuries (Park et al., 2018).

**Lumbo-pelvic-hip complex dysfunction**

The lumbo-pelvic-hip complex (LPHC) is made up of the lumbar spine (low-back area), pelvis, abdomen, and hip musculoskeletal structures and is commonly referred to as “the core.” The LPHC is an important anatomical structure because it connects the upper and lower halves of a person’s body. Increasing strength and stability of the LPHC is important for improvements in health, sports performance, and prevention of injuries because an unstable core limits the ability of the limbs to properly produce force and predisposes an individual to back or hip pain (De Blaiser et al., 2018; Granacher et al., 2013; Hewett et al., 2005; Richardson et al., 2002). In fact, nearly 80% of adults experience some form of low-back pain at least once during their lifetime (Nam, 2011). As such, fitness professionals must have working knowledge of the muscles that make up the core and design fitness programs that increase core stability and strength.

**Shoulder dysfunction**

Shoulder pain is a common occurrence, especially as the body ages. Simple, routine movements, such as taking out the trash, getting dressed, or reaching for something overhead, can often cause discomfort when the shoulder joints are in a deconditioned state. Shoulder pain and injuries are also quite common in sports and weight training, especially during overhead lifting. Shoulder problems may be due to the instability of the shoulder joint or impingement of the soft tissue or bony structures of the shoulder, known as shoulder impingement syndrome (Mitchell et al., 2005).

Because so many functional movements involve the shoulders, fitness professionals must have a working knowledge of their muscles and structures. A regular routine of upper-body flexibility and properly implemented strength training can help reduce the risk of shoulder injuries. In addition, fitness professionals should ensure clients perform high-intensity exercises correctly and only engage in training programs that are suitable for their individual abilities, goals, and objectives; for example, aggressive swinging pull-ups and hammer swing exercises can be dangerous for individuals without advanced levels of shoulder fitness already in place (Summitt et al., 2016).

**Head and neck dysfunction**

Headaches and neck pain are common ailments, and poor posture of the head and neck are often the cause. Much of the time, poor head and neck posture is due to extended periods looking at computer screens or mobile phones. For example, *text neck* is a growing phenomenon that researchers are investigating to identify whether habitual use of cell phones influences neck pain (Gustafsson et al., 2017; Xie et al., 2016). Placing the head in a constant state of flexion (looking downward) affects many of the muscles of the neck area and may cause neck soreness.

Forward head posture is another common cause of head and neck pain. Jutting the head forward increases the workload for many of the muscles attached to the cervical spine (upper spine area), which has the job of stabilizing the head. Over time, forward head posture can lead to dysfunction of the neck area as the body tries to adapt and find efficient ways to raise the head for straight-ahead vision. Forward head posture can be seen in office workers and other individuals who routinely work in front of a computer and naturally tend to migrate the head toward the screen when trying to focus (Nejati et al., 2015; Szeto et al., 2002).

Exercise has been shown to be beneficial for individuals exhibiting forward head posture, especially for the reduction of lingering neck discomfort (Sheikhhoseini et al., 2018). Many people who seek the services of a fitness professional are habitual mobile phone users or office workers who spend most of their day working on a computer. Consequently, fitness professionals should monitor the position of their clients’ head and neck during exercise to minimize the risk of injury and help train proper posture and movement patterns.