Turf Toe

ClientY is a 37 year old male athlete with primary occupations as a personal trainer and karate instructor. ClientY is an average-lean mesomorph at 6 feet tall and 212 pounds.

Due to his occupations/activities in "high-impact sports", he has experienced multiple injuries including: sprained neck, shoulder sprains, low back strain, bruised right knee cartilage, sprained left ankle, torn left medial collateral ligament, fractured patellas, broken left 5th toe, fractured 1st phalanx and torn 1st metatarsophalangeal (MTP) joint capsule in left hallux, lost right hallux nail.

ClientY has a slight anterior pelvic tilt with slight forward-head. Using Brugger's cogwheel concept, either the forward-head and/or the anterior pelvic tilt can elicit compensations elsewhere especially as the pelvis is a keystone structure (Page, Frank, & Lardner, 2010). Anterior tilting is associated with tight hip flexors (functional postural chain) (Page et al., 2010).

ClientY has a slight intoe gait from playing semi-professional football. Intoeing provides less medial foot-roll, stiffer ankle joint translating into less energy absorbed/dissipated upon ground impact (faster cutting) (Young, 2008). Intoeing may result from several factors including internal tibial torsion and internal femoral torsion (femoral anteversion) (Croydon Health Services, 2012). As the kinetic chain is linked, tibial/femoral torsion promote knee valgus, anterior knee pain, knee/hip osteoarthritis, and other pathologies (Kulig, Harper-Hanigan, Souza, & Powers, 2010; Running Reform, 2013). Intoeing is a functional adaptation, but it may cause global compensations affecting multiple muscle slings when considering the tibia, femur, and pelvis keystones (Page et al., 2010).

ClientY's left hallux injury sustained from sudden impact-induced hyperflexion ("turf toe") has limited his passive and active hallux dorsiflexion range of motion (hdROM)--subsequently impeding lunging, split squats, and forefoot-leading karate kicks (Frimenko et al., 2013). Pain from movements involving the 1st MTP complex translated into the medial side of the ipsilateral knee.

The capsular ligamentous sesamoid complex of the 1st MTP sustains 40% to 60% of body weight during normal gait; athletic activities increase the load by 2-8 times body weight (Childs, 2006; McCormick & Anderson, 2009). The flexor hallucis longus tendon's passage goes right under the area of most pressure from body weight (Earls & Myers, 2010). Assisting with hallux function are the extremity flexor/extensor slings: extensor/flexor hallucis longus, tibialis anterior, peroneus longus, and the local retinaculum (dense fascia "crural sock" supporting covering) (Childs, 2006; Earls & Myers, 2010; Page et al., 2010). Earls & Myers (2010) described primary/secondary "arches/curves" [throughout the body] (acting as tensional springs) starting from the toes/ball-of-foot going upwards. Secondary curves (spanned by the superficial back line) are maintained primarily via the balance of soft tissue as opposed to the bones (Earls & Myers, 2010).

To summarize, the human body is interconnected by articular, muscular, and neurological chains (Page et al., 2010). Local destabilization may likely result in global compensation via

feedback/feed-forward mechanisms and altered movement patterns (Page et al., 2010). Hallux 1st MTP limited ROM influences: altered proprioception, altered balance, positional compensations (pain avoidance); ankle stability/position (pain avoidance) which can alter posture/movement patterns going from knee, lumbopelvic hip complex and spine.

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