

For my steam project, I will be covering what the chest muscle consists of, how a muscle contraction is induced, and what occurs when the muscle gets damaged. Performing a movement in the gym such as a bench press causes a lot of muscles to contract but the main big muscle that performs the movement is the chest. The chest muscle consists of the pectoralis major, pectoralis minor, and pectoral girdle (Betts et al. 2013). These parts of the muscles assist in flexion, adduction, and rotation (Betts et al. 2013).

The contraction of muscles is powered by repeated arrays of sarcomeres that consists of filaments known as myosin and actin (Sweeney and Hammers, 2018). Striated muscle contraction is regulated by the intracellular Calcium $2+$ (Ca^{2+}) in the thin filament proteins of troponin (Tn) and tropomyosin (Tm) (Gomes et al. 2002). To start the process of contraction action potential (AP) is released and arrives at the neuromuscular junction (Betts et al. 2013). Acetylcholine (ACh) is then released binding to receptors proceeding AP in the sarcolemma (Betts et al. 2013). Ca^{2+} ions are present in the sarcoplasm reticulum (SR); the myosin head and actin are activated undergoing a power stroke which is responsible for interaction between thin and thick filaments sliding next to each other resulting in muscle contraction (Gomes et al. 2002). Once work is done Ca^{2+} is removed by getting pumped back into the SR causing the Tm to reshift the binding sites on the actin strands (Betts et al. 2013).

Muscle tears occur often, more often than you probably think. It could be as minor as walking where small muscle tears occur, to as big as a whole muscle getting torn off a bone. Muscle damage is seen by prolonged weakness and a delayed start of stiffness/ soreness (Allen et al. 2005). Muscle damage that is stretched-induced is more known in muscle dystrophies and the more extreme muscle damages are possibly similar in pathways (Allen et al. 2005). It is known that muscles that are damaged gather up calcium and that increasing calcium in the normal muscles leads to aspects of muscle damage (Allen et al. 2005). Muscle damage is more known during a stretched targeted movement, causing immediate weakness and taking several days to recover (Allen et al. 2005). Simultaneously after muscle damage, a substantial release of soluble muscle proteins, such as creatine kinase, and inflammatory cells get attracted to that muscle damage (Allen et al. 2005). Regeneration of skeletal muscle fibers and the cells/ tissue changes and weakness of the muscle damage is repaired over several weeks from satellite cells (Allen et al. 2005). Large/ long stretched contractions cause muscle damage, it is also probable that short/ small contractions can cause muscle damage as well (Allen et al. 2005).

Overall, the chest muscle consists of three main parts the pectoralis major/ minor and the pectoral girdle. The muscles contract in a step-by-step process with the contraction caused by the myosin and actin activating and interaction between thin and thick filaments sliding next to each other. Muscles damage by being too weak or a start of stiffness/ soreness. The muscles get repaired in a process and can take as little as a couple of days to a couple of weeks depending on the damage.

Literature Cited

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