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Kin 856; Exercise #4 Movement Description

Analysis: Butterfly Stroke, Muscle Identification

Pull/Catch- The biceps brachii, triceps brachii, trapezius, and muscles of the scapulae (supraspinatus, infraspinatus, levator scapulae, teres major, teres minor) work together for the circumduction of the shoulder joint. The trapezius, erector spinae, rhomboid major, and rhomboid minor are additional muscles that contract isometrically to increase propulsion of the circumduction of the shoulder joint. The rectus abdominis, external abdominal oblique, internal abdominal oblique, and serratus anterior stabilize the body during the pull phase and prepares the lower body for the downbeat. The forearm muscles stabilize the wrist to externally rotate using the extensors (extensor carpi radialis longus, extensor pollicis longus, abductor pollicis longus, extensor pollicis brevis).

Downsweep/Insweep- The biceps brachii and triceps brachii work together to continue circumduction of the shoulder joint. The erector spinae stabilizes the lower body in continuation with the rectus abdominis and external and internal obliques. The muscles of the pollicis continue to work isometrically with the extensors to keep the palms tightly closed as they pull through the water. The insweep movement works both the biceps brahcii and triceps brachii muscles as well as the flexor muscles (flexor carpi radialis, flexor carpi ulnaris, and palmaris longus) which helps in elbow extension and wrist flexion as they move through the insweep stage.

Up/Outsweep- The up and outsweep phase of the butterfly stroke works the same muscles mentioned above throughout circumduction of the shoulder joint, especially the triceps brachii muscles (long head, lateral head, and medial head). The triceps are one of the primary muscle groups that is contracting as the arms move upwards since the remaining part of the forearm and hands are still below the water line (causing more stress on the shoulder and triceps). The biceps brachii and brachialis muscles continue to act simultaneously with the triceps.

Recovery (Upbeat)- During the upbeat stage, the legs should be kept together and planterflexed. The tibialis anterior helps the ankle joint remain plantarflexed, as well as the flexor digitorum longus. The solues muscles also activate to maintain proper position of the plantarflexion. The rectus femoris, vastus lateralis, and vastus medialis contract to aid in knee flexion as the legs begin their descent after the upbeat. These muscles also remain contracted to keep the legs straight during the upbeat as well as the gluteus maximus, medius, minimus, and tensor fasciae latae.

Recovery (Downbeat)- During the hip flexion of the downbeat, the rectus abdominis continues to contract with the internal abdominal oblique, external abdominal oblique, and transverse abdominis. The gluteus maximus, medius, and minimus all contract during hip flexion, as well as the biceps femoris, (long head and short head) vastus lateralis, adductor magnus, and adductor minimus. These hamstring and gluteus muscles are used to straighten the legs and knees in accordance with the next phase. The arms maintain utilization of the biceps brachii, deltoids, and triceps brachii muscles throughout the recovery stage in continuation with the entry into the pull.