

## D-P-6

**Comparative Study of Upper Extremity Muscle Activities in Skilled and Beginning Archery Players**

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**Purpose:** The purpose of this study was to clarify the muscle activities of upper extremity muscle groups and to compare between skilled and beginning archery players, using surface electromyography (surface EMG) in anchor and in release while playing archery.

**Methods:** The subjects were seven male skilled archers (Ar-G) and seven beginner archers (Co-G). The surface EMG was recorded from both upper extremity muscle groups and analyzed integrated EMG (iEMG) by using EMG analyzed software (BIMUTAS II).

**Results:** As to the comparison of the data in anchor versus in release, data of the M. deltoideus (posterior) in both upper extremities in Ar-G was significantly lower than that in Co-G ( $p < 0.05$ ). Muscle relaxation in Ar-G was confirmed conspicuously. In addition, data of the M. extensor digitorum comparing muscular contraction in anchor versus in release show a significant increase in Co-G compared with Ar-G ( $p < 0.05$ ).

**Discussion:** Ar-G caused muscle activity of M. deltoideus (posterior) in both upper extremities in anchor and caused muscle relaxation in release. While on the other hand, Co-G caused voluntary movement to let go of a string with a finger of the pull upper extremity in release. Furthermore, in Ar-G no significant differences in common digital extensor muscle between in anchor and in release was shown, we presume that Ar-G were using eccentric muscle contraction during movement to release the string.

**Key words:** Archery, upper extremity muscle groups, iEMG

## D-P-7

**Autophagy is involved in cancer cachectic skeletal muscle wasting process in tumor-bearing mice.**

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Cancer cachexia is a highly complex metabolic disorder involving features of anorexia, anemia, lipolysis, activation of acute phase response, and insulin resistance. Patients exhibit a significant loss of lean body mass including the skeletal muscle, which contributes to nearly 15% of all cancer deaths. Although ubiquitin-proteasome system has been known to play a critical role in the muscle wasting, recent studies propose the contribution of autophagy-lysosome system to this process. However, its underlying mechanisms are still largely unknown. Here, we established an experimental system using human-to-mouse xenotransplantation models of human colorectal cancer to investigate muscle wasting in cachexia. Five cases that successfully grew in NOG mice were fixed for immunofluorescence microscopy. An autophagosome marker LC3 was detected as several fine dots in the muscle fibers in control muscle. In tumor-bearing mice, the LC3-dots were significantly increased and often observed as ring or cup-shaped structures, indicating typical autophagosomes. When double-stained with LC3 and p62, p62-dots were largely colocalized with LC3-dots. This study supports the idea that autophagy plays important roles in the muscles wasting in cancer cachexia, and suggests that p62 might mediate this process.