Learning support system for under throwing motion using electric muscle stimulation

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In general, learning motor skills takes time. The process of receiving and modifying effective feedback from an instructor or system is important for learning. Previous studies have shown that beginners learn better with high feedback frequency. For this reason, many systems that provide real-time feedback with visual and haptic stimuli have been proposed. However, most of these systems are designed for actions that are not fast, such as playing musical instruments, and few of them are designed for sports actions. The user corrects the motion later than the system intended because it takes a small amount of time to correct the motion after receiving the stimulus. One of the reasons it is difficult to apply the existing methods to sports movement instruction is that this discrepancy is much more significant in sports movements because the movements are fast. This thesis presents a system for solving this problem by combining electric muscle stimulation (EMS) and prediction technology. In order to improve the control ability of the underhand throw, this system is proposed to use EMS to tell the subject the release point during the underhand throwing motion and verified the learning effect. This experiment has revealed that the EMS tended to be effective in teaching the release point of the ball, although it did not improve the control ability of the down-throwing throwing motion. In addition, it has not yet been fully verified whether EMS is effective in motion learning, but this thesis revealed that it can be applied to support motion learning.