A study on feature of eye tracking in difference of skill level during observational learning of throwing motion

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[Purpose]
There is an observational learning as one of the methods of the movement skill acquisition. The observational learning is learning method which movement skill can be acquired only by the observation. In the observational learning, it is important which part to observe. This study extracted feature of eye tracking in the baseball experts and inexperienced persons during observational learning of throwing motion. The purpose is to clarify the efficient observational learning method by comparison of eye tracking.

[Method]
In the present study, 6 experts (four males and two females) and inexperienced persons (six females) in total twelve subjects were used. Using eye tracking system of my own making, we detected the glance of the experts and inexperienced persons. Subjects observed throwing motion of the baseball expert presented in the monitor. We compared the experts with inexperienced persons in the observational method from feature of eye tracking in the experts and inexperienced. Three elements (a glance transition, glance total moved distance, and the gazing duration) were used for the comparison of the observation methods.

[Results and Discussion]
It was clarified that the experts were emphatically observing specific region of movement and inexperienced persons entire throwing motion from the results at the feature of eye tracking. And we obtain the result what expert's glance total moved distance was shorter than inexperienced persons, and expert's gazing duration was longer. From these results, we indicate that the experts efficiently observing point of movement in observational learning. Additionally, as a hypothesis, we can think that effect of observational learning is nurtures by inexperienced persons imitate observing method of the experts.

[Key Words]
Observational Learning, Eye Tracking, Motor Skill Level

Evaluation of motor control using haptic device:force and distance perception

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[Purpose]
In the aged society, an increase of the senior citizen is a serious problem in the health care facilities. And then, it is very important to evaluate the recovery of the motor function in the rehabilitation treatment. The purpose of this paper is to evaluate the motor control, perception of heaviness and distance in control and fatigue conditions using psychophysical experiment. We used a haptic device in order to generate precise force and distance, but the precedent of the evaluation system with the haptic device was few. It was therefore another purpose to examine whether the haptic device was useful as evaluation system for the motor control.

[Method]
The psychophysical value of force and distance was measured by two kinds of experiments. Six healthy subjects participated in this study. The stimulation was presented by haptic device [PHAMTOM Omni: SensAble Company]. Force stimulation was 0.175N~0.325N at ±0.025N range. Distance stimulation was 8.50~11.50cm at ±0.25cm range. The subjects compared between standard and test stimulation, and answered it had felt which stimulation was strong.

[Results and Discussion]
In result of the psychophysical value of force, just noticeable difference (JND) had a significant difference between control and muscle fatigue. This result showed that distinction between standard and test stimulation was difficult in muscle fatigue. On the other hand, in the result of the psychophysical value of distance, there was not difference between control and muscle fatigue in JND. This result showed that perceptive sensibility to distance didn't decrease in muscle fatigue. Therefore, in muscle fatigue, control of force was influence, but control of distance was no influence. Moreover, these results suggested that the haptic device was useful as the evaluation system for the motor control by these results.

[Keywords]
Motor control, Haptic device, Psychometric function