

Abstract

Title: The difference in maximum force of the roundhouse kick between free execution and reaction to a visual stimulus.

Objectives: Comparison of the maximum force of a roundhouse kick executed in ideal conditions versus with an emphasis on the fastest reaction to a visual stimulus.

Methods: This is a non-invasive experimental study with a within-subject design, in which participants performed two sets of measurements after individual warm-up. They executed two series of five roundhouse kicks using their dominant limb, one focussing on maximum force under ideal conditions and the other emphasising maximum force in response to a visual stimulus. The order of the measurements was randomised.

Results: The study included 42 participants (27 men and 15 women). The results showed that the maximum force of the kick in response to a visual stimulus was significantly lower than under ideal conditions. The average maximum force of the kick under ideal conditions was 611 N, while in response to a visual stimulus it was 552 N. This difference of 59 N (9.7%) was statistically significant ($p = 0.0001$). The study also found that women's performances were more consistent than men's by 30.2% (32.6 N). Furthermore, the results showed that the subjective perception of effort varied by 6% between conditions and by 10.6% between genders, and that the subjectively perceived effort did not always correspond to the actual exerted force, especially in conditions requiring a quick response to visual stimuli.

Keywords: martial arts, roundhouse kick, maximum force, visual reaction