# Factors Influencing the Impact Force of the Taekwondo Roundhouse Kick*

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## ABSTRACT

***The roundhouse kick is a powerful taekwondo move, commonly used in sparring matches. The kick's power could be derived from the angular position and activation of muscles controlling the ankle joint. The aim of this study was to investigatethe ankle joint angle and activation of the lower leg muscles at different levels of impact force. Twenty Thai,black-belt, male, Taekwondo athletes performed roundhouse kicks with their maximal effort. Ankle joint motion was recorded using an electrogoniometer sensor. Activations of gastrocnemius and tibialis anterior muscles were monitored using surface electromyography. The athletes were divided into two groups based on their maximal impact forces: high (HI; 172.03 ± 19.36 N) and low (LO; 110.14 ± 20.20 N). Comparisons between the two groups showed that the HI group demonstrated significantly less plantarflexion angle and gastrocnemius activation than the LO group (P < 0.05). This indicates that impact force of the roundhouse kick may depend on the ankle joint position and gastrocnemius activation.***

**Keywords:** Anklejoint, Impact force, Muscle activation, Roundhouse kick, Taekwondo

## INTRODUCTION

Taekwondo is a martial art that has crossed over into sports, gaining popularity in the process. One of the basic techniques in taekwondo is kicking. The roundhouse kick is one of the most frequently used in competition,since it can be performed rapidly and powerfully(Matsushigue et al., 2009; Roh and Watkinson, 2002). It is performed by lifting the kicking leg in an arc towards the front of the body, followed by extending the knee rapidly until the instep of the kicking foot strikes the target, exerting force. Consequently, as the most distal segment responsible for the impact, the ankle joint plays an important role in controlling the power of the kick.

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