Kinematics and Efficacy Analysis of the Seni Silat Cekak Malaysia (Kaedah A)

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Abstract. Kaedah A is a fend off technique engaged in Seni Silat Cekak Malaysia, upon confronting a punch force exerted within the vicinity of the thorax area. Hitherto, there is still lack of biomechanical analysis on the execution of Kaedah A. Therefore, this study aims at analysing the effectiveness of Kaedah A based on the total execution time as well as to describe the kinematic characteristics of the hand movement upon its execution. The experiment was carried out by means of motion capture. Microsoft Kinect was utilised to detect the hand movement whilst the post processing of the captured motion was performed via Virtual Sensei Lite. Kaedah A was executed five times by an experienced Seni Silat Cekak Malaysia practitioner to investigate the accuracy and repeatability of the system. The data obtained serves as an input for the trajectory mapping for both initial and end point identification. The time difference, Δt between the points demonstrates that the total time execution for Kaedah A is less than 0.1 s. Further analysis involves filtering the coordinate data obtained in order to generate the polynomial function of the hand movement during the execution of Kaedah A. It could be concluded that the Kaedah A execution has the features of a ballistic movement. The findings provides useful data for reliability prediction as well as further enhancement of the Kaedah A itself.

Introduction

A punch is targeted to defeat an opponent at a controlled distance in the shortest time possible and often the time for a punch to reach its target is about 0.1 s [1], [2]. The reaction of an opponent towards a punch varies from evading, grabbing, fending off or even merely being stunned. The estimated minimum theoretical time taken for a normal human to react is 0.18 s which is essentially the summation of the minimum time for each of the following phases; i) realisation of the stimulus (0.05 s), ii) selection of an adequate reaction (0.05 s) and iii) start movement (0.08 s) [2]. This suggests that, the ability to defend from this type of offensive movement is almost impossible.

Seni Silat Cekak Malaysia (SSCM) is a Traditional Malay combat oriented art that engages 99% of its fighting skills on defend techniques. SSCM practitioners do not evade upon managing attacks as they fend off effectively and move forward. There are four different type of fend off techniques that serves as first moves in every defensive move in SSCM, viz. Kaedah A, Kaedah B, Kaedah C and Kaedah D. All of the aforementioned methods are able to avert attacks depending on the location of the point of attack.

Kaedah A is a fending off move that is initiated upon averting a punch within the vicinity of the abdomen area. Fig. 1a and Fig. 1b depicts the initial and final positions of the hand upon execution of this technique, respectively. Nonetheless, there is still lack of biomechanical analysis of the