

Kinematic analysis of athlete's movement in Flat water Kayak

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Introduction

Accurate kinematic analysis of human movement is a significant factor for the improvement of movement performance and for the reduction of injuries. The Flat water Kayak is a very technique demanding activity/sport. However, there only very few previous studies concerning the analysis of athlete's movement in Kayak (Someren et al., 2000) and specifically for the analysis of kinematic characteristics (Mann and Kearney, 1980). The main reason for that are the difficulties that are presented during the recording set up process, due to the large field that the movement take place. The main aim of the study was the estimation and analysis of the kinematic parameters of Flat water Kayak movement in vivo conditions.

Method

The kinematic analysis was based on the movement of eight (8) top-level athletes of Kayak with age ranged from 18 until 31 years, using a high speed Redlake PSI 1000S with possibility of 1000 fr/sec. The recording process was accomplished from two different optical viewpoints: a) vertical to the movement and b) parallel.

Results

The analysis of athlete's movement, was separated in five different time phases: a) the entrance of oar, b) the application of promotional force, c) the start of get off process of oar from the water, d) the completion of get off process and e) the preparation of the oar entrance in the water. The summary of the results were presented in the following tables.

Oar Entr. Ang ^o Fro	Oar Entr. Ang ^o Sag	Oar Get. off Ang ^o Fro	Oar Get. off Ang ^o Sag	Trunk F Ang ^o Ent	Trunk F Ang ^o Get. off	La Trunk F Ang ^o Ent	Oar Ang ^o Sag Peak Vel	Shoulder Ang ^o Peak Vel
51,3 ± 3,1	42,7 ± 3,2	66,5 ± 2,9	31,6 ± 2,5	15,6 ± 4,3	3,9 ± 1,1	16,6 ± 2,90	70,2 ± 4,80	56 ± 3

Left elbow Angle			Right elbow Angle		
Oar Entrance	Peak velocity	Oar Get off	Oar Entrance	Peak velocity	Oar Get off
45,2 ± 2,9	59,7 ± 7,9	13,3 ± 3,8	9,7 ± 4,8	66,2 ± 5,2	51,7 ± 3,1

Discussion -Conclusion

From the analysis of the measurements indicated that parameters which mainly effected to the athletes performance and must be considered during the training process, were: a) the angle during the oar entrance in to the water and the respective during the get off (considered in to frontal and sagital plane), b) the flexion and the lateral flexion of the trunk, during the oar entrance in to the water c) the shoulder angle during the time that appearance of the boat peak velocity and d) the differences of the peak velocity magnitude presented during the rowing in the left and right side

References:

[Mann R.V.](#) and [Kearney J.T.](#) (1980) A biomechanical analysis of the Olympic-style flat water kayak stroke. *Medicine Science Sports Exercise*, **12(3)**, pp. 183-188.

[van Someren K. A.](#) [Phillips GR.](#) [Palmer GS.](#) (2000) Comparison of physiological responses to open water kayaking and kayak ergometry. *International Journal of Sports Medicine*. **21(3)**, pp. 200-204.