DEVELOPMENT OF EQUIPMENT FOR ESTIMATING SWIMMING POWER

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INTRODUCTION: In previous studies on this topic, the methods of measuring swimming power during swimming were examined. Costill et al. (1983) developed the method of evaluating swimming power by improvement of the biokinetic swim bench. It was suggested that swimming power is one of the more important components of the sprint swimming performance. However, it was difficult to apply the equipment for measuring swimming power to the swimming training, because the equipment for measuring this was complex. Therefore the purpose of this study is to develop simple equipment for estimating swimming power.

METHODS: The main body of the equipment for estimating swimming power (EESP) was made from wood. The body of EESP was a shape similar to a kickboard and the size of the body of EESP was 450mm high by 235mm wide by 38mm thick. The body of EESP floated, and the resistant portion was attached to the body of EESP in the water. The resistant portion could be altered, by changing the load. There were four resistant parts. The relationship between the resistant force and the velocity on each resistant part was measured by using the device for evaluating force and velocity simultaneously. The subjects selected for the study were five female competitive swimmers. The subjects swam 25m using their maximum effort in front crawl swimming under two conditions. The first condition was free swimming. In the second condition, the swimmer towed the body of EESP connected with the waist belt and the rope. The swimmer had four trials in second condition with each load, as there were four different loads of the EESP. The swimming velocity for each condition was calculated from video data (sampling frequency was 30 Hz) and the swimming velocity was evaluated from 15m to 25m after pushing off the wall, in order to exclude the effect of the start. The swimming force was calculated in each condition, and the swimming power was calculated by multiplying the swimming force and swimming velocity.

RESULTS: The swimming velocity on free swimming was 1.64±0.04(m/sec). The swimming force was decreased in inverse proportion to the increase of swimming velocity. The maximum swimming power was 60.90±4.02 (watt). Figure 1 shows the relationship between maximal swimming power and swimming velocity (r=0.35).

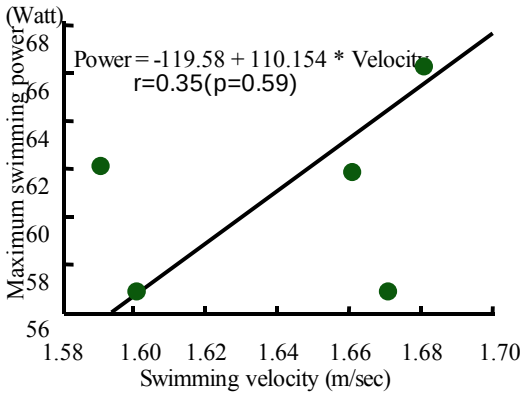

Figure 1 - The relationship between swimming power and swimming velocity.

CONCLUSION: The EESP was simple and provided the required measurement of swimming power and swimming force. It was possible to apply the EESP to the swimming training, because the EESP was able to assess the swimming power and force when the swimming velocity only was measured.

REFERENCES:

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