

# 形状及び素材の異なる水着が水泳時の 推進パワーおよび腹腔内圧に及ぼす影響

東京学芸大学 森 山 進一郎  
(共同研究者) 鹿屋体育大学 萩 田 太  
同 萬 久 博 敏

## Effects of Swimming Suits with Different Styles and Materials on Propulsive Power and Intra-abdominal Pressure during Swimming

by

Shinichiro Moriyama  
*Tokyo Gakugei University*  
Futoshi Ogita, Hirotohi Mankyu  
*National Institute of Fitness and Sports*

### ABSTRACT

Present study aimed to clarify the effects of swimming suit with different styles and materials on active drag and intra-abdominal pressure (IAP) during front crawl swimming with arm stroke only (pull) and whole-body stroke (swim). Ten well-trained male collegiate swimmers ( $1.72 \pm 0.06\text{m}$ ;  $66.6 \pm 5.9\text{kg}$ ;  $21.3 \pm 1.7\text{yr}$ ) participated in this study. For this experiment, IAP was determined during both pull and swim with maximal effort, and drag-swimming velocity relationship and maximum propulsive power were determined during only pull, wearing competitive swimming suit (RS) and conventional swimming suit (CS). IAP was measured using the mean of 2 stable front crawl stroke cycles taken from the difference between minimum and maximum values in each cycle. Active drag force and maximum propulsive power were measured during pull using a system of underwater push-off pads instrumented

with a force transducer (MAD system). Maximum swimming velocities during pull and swim were significantly higher RS than CS. On the other hand, there were no significant difference in IAP between swim suits, and also between pull and swim. There were no significant difference in the estimated drag values at 1.6, 1.8, 2.0m.s<sup>-1</sup>, maximum propulsive power and IAP related to swimming velocity between RS and CS. These results suggest that RS would contribute to improve swimming performance compared to CS, but that it would not be brought any influences on maximum propulsive power, drag-swimming velocity relationship and IAP.

## 要 旨

本研究は、形状と素材の異なる水着が泳速-抵抗関係と腹腔内圧 (Intra-abdominal pressure, 以下 IAP と略す.) に及ぼす影響を明らかにすることを目的とした。大学男子競泳選手 10 名に、形状と素材の異なるレース用および練習用水着を着用させ、クロール泳のアームストローク泳 (以下プルと略す.) と全身泳 (以下スイムと略す.) における最大努力時の速度と IAP を測定した。さらに、プルでは、抵抗測定装置を用いて最大下から最大努力で泳いだ際の泳速-抵抗関係、IAP および最大推進パワーを測定した。その結果、最大努力による泳速は、プルおよびスイムともに練習水着よりもレース水着の方が有意に速かったが、IAP に有意差は認められなかった。一方、泳速-抵抗関係の回帰式より推定された同一泳速での抵抗値、最大推進パワーおよびその際の IAP は、水着間で有意差は認められなかった。以上より、レース用水着の着用は、プルおよびスイム共にパフォーマンス向上に貢献するものの、IAP、泳速-抵抗関係や最大推進パワーには影響を及ぼさないことが示唆された。