Upper Extremity Muscle Activity While Wearing Different Triathlon Wetsuits

Andy Do, Cordero Roche, M.S., Andrew Craig-Jones, M.S.,
Dr. John Mercer, Ph.D.
Department of Kinesiology and Nutrition Sciences, University of Nevada, Las Vegas

ABSTRACT

When participating in water sports under extreme aquatic conditions such as deep-sea diving, windsurfing, or wakeboarding, it is imperative to wear a wetsuit for safety and performance. Wetsuits are bodysuits that can be worn underwater to provide thermal insulation under cold water conditions (Wetsuit Warehouse, 2018). Wetsuits consist of a material known as foamed neoprene which are small closed cells filled with air designed to trap heat against cold water, providing insulation (Evo, 2018). Triathletes also wear wetsuits in order to help with thermoregulation as well as swim performance. However, it is not known if the wetsuit requires more muscle activity during swimming. PURPOSE: The purpose of this study was to compare muscle activity while not wearing a wetsuit, wearing a wetsuit with full sleeves, and wearing a wetsuit with no sleeves. METHODS: A within subject design was used for the experimental approach in that all subjects completed all conditions. The independent variables in this study is the wetsuit condition (no wetsuit, full sleeve wetsuit, no sleeve wetsuit). The dependent variable was average muscle activity on the anterior deltoid (AD), posterior deltoid (PD), biceps brachii (BB), and latissimus dorsi (LD). Electromyography signals from four muscles were measured using Cometa S.r.l equipment. RESULTS: The average muscle activity for Subject 7 without wearing a wetsuit was 195.1942 mV, wearing a full sleeved wetsuit was 112.6924 mV, and wearing a non sleeved wetsuit was 149.2149 mV. CONCLUSION: Our findings report that the average muscle activity for Subject 7 without wearing a wetsuit was 3.038 mV, wearing a full sleeved wetsuit was 2.432 mV, and wearing a non sleeved wetsuit was 3.945 mV. In conclusion, it appears that wearing a wetsuit will not have an influence on muscle activity and may provide faster lap times for the subject.

INTRODUCTION

It is imperative that a wetsuit can perform many functions while maintaining the user’s body temperature at an equilibrium, but will it affect any range of motion or perceive any complications for the user? Therefore, the purpose of this study was to compare muscle activity while not wearing a wetsuit, wearing a wetsuit with full sleeves, and wearing a wetsuit with no sleeves. Electromyography (EMG) was used to measure muscle activity on the following upper extremities: the biceps brachii (BB), anterior deltoid (AD), posterior deltoid (PD), and latissimus dorsi (LD). Only the posterior deltoid muscle is reported in this manuscript.

PURPOSE

The purpose of this study was to compare muscle activity while not wearing a wetsuit, wearing a wetsuit with full sleeves, and wearing a wetsuit with no sleeves.

METHODS

Subjects:
- The study included n=7, but the manuscript focused on subject 7.
- Male and female adults (n=7 [age±29.3±25.25 years, 79.37±11.33 kg., 1.80±0.10 m].

Instrumentation:
- Electromyography unit (Cometa S.r.l., Scottsdale, AZ, USA)
- 3D scanning program
- Wet suit (S-L)

Procedures:
- EMG was recorded for the anterior deltoid (AD), posterior deltoid (PD), biceps brachii (BB), and latissimus dorsi (LD).
- 3 tests were taken:
  - 50 meter swim without a wetsuit
  - 50 meter swim with a full sleeved wetsuit
  - 50 meter swim with a sleeveless wetsuit

RESULTS

The average muscle activity for Subject 7 without wearing a wetsuit was ±195.1942 mV, wearing a full sleeved wetsuit was ±112.6924 mV, and wearing a non sleeved wetsuit was ±149.2149 mV.

CONCLUSION

In conclusion, it appears that wearing a wetsuit will not have an influence on muscle activity and may provide faster lap times for the subject. Therefore, a wetsuit will be an important piece of equipment for triathlon participants as it does not influence muscle activity while keeping the user thermoregulated.