

Designing a suit using Electro muscular stimulation Technology (EMS) to raise physical efficiency and improve vital functions

Prof. Yasser Mohammed Eid

Head of Apparel Design & Technology Department, Professor of Measurements and Quality Control, Faculty of Applied Arts - Helwan University, yasserEid@a-arts.helwan.edu.eg

Prof. Eman Raafat Saad

Professor at Apparel Design & Technology Department, Faculty of Applied Arts - Helwan University, Dr.emanraafat@yahoo.com

Yasmin Omar Darweesh Mahmoud Seoudi

Fashion designer

Yasmin2947@a-arts.helwan.edu.eg

Abstract:

Recently, the use of electrical muscle stimulation (EMS) suits during exercise has become widespread, as they save time. As the trainee only needs to exercise for 20 minutes twice a week to train all the muscles of the body, instead of exercising for an hour daily. It is a sports suit embedded with a number of electrodes. The electrodes emit electrical pulses that help to stimulate the body's cells and muscles with less effort and in a shorter time. This study examined the design of EMS suit, its use, and the results of training while wearing it to measure the effectiveness of EMS suit as a type of smart and functional clothing. Then a lower-cost suit was designed and tested and its effect on the body was conducted after using it for 12 sessions, twice a week for 20 minutes. The results showed the effectiveness of this suit in reducing weight, decreasing fat percentage, controlling body measurements, and significantly improving muscle activity.

Research Problem: The research problem can be formulated into the following questions: • Is it possible to determine the functional performance characteristics of an EMS suit? • What is the feasibility of designing an EMS suit? • Is it possible to determine the optimal application of an EMS suit for weight loss, reducing body fat, improving physical fitness, enhancing muscle activity, and increasing muscle mass? • Is it possible to determine the effectiveness of using an EMS suit in increasing physical efficiency and improving vital functions?

Research Objectives: • To determine the functional performance characteristics of an (EMS) suit and design another one. • To determine the optimal application of an (EMS) suit for weight loss, reducing body fat, improving physical fitness, enhancing muscle activity, and increasing muscle mass. • To determine the effectiveness of using an (EMS) suit in increasing physical performance and quality of life.

Significance of the Research: • This study developed a training program based on the use of applied (EMS) suit to enhance physical performance and quality of life. • Contribute to laying the scientific foundation for the manufacture of the (EMS) suit in Egypt and the Arab world. • Provide Arab libraries with a study on electronic clothing to enable them to keep pace with the tremendous scientific and technological advancements taking place worldwide in this field. • Keep pace with scientific technologies in the sportswear industry as one of the applications of smart clothing. • Provide researchers with the opportunity to conduct further applied studies on smart sportswear.

Research Limits: Subject Limits: This research is limited to studying the use of electrical muscle stimulation (EMS) suits to enhance physical performance and quality of life.

Research Methodology: • Descriptive Method, • Experimental Method

Research results : The results of using the applied EMS suit were almost the same results of using the EMS suit available at the gym centers

Paper History:

Paper received July 19, 2025, Accepted September 8, 2025, Published online November 1, 2025

Keywords:

Smart Clothing, Effectiveness, EMS, Electrical Muscle Stimulation Suit, physical efficiency

References:

- 1- A Study on Product Analysis and Wearing Evaluation of EMS Smart Clothing, Sojung Lee, Hyelim Kim, Daeyoung Lim, Wonyoung Jeong, Journal of the Korean Society of Clothing and Textiles, 2024

-
- 2- Electrical muscle stimulation: The effects on weight reduction, percentage of fat and waist circle in overweight women “ priska dyana Kristi 1, dr.dr.bm.wara kushartanti2 , rifqi festiawan3 , journal of critical reviews, 2020.
 - 3- Physical training augmented with whole body electronic muscle stimulation favorably impacts cardiovascular biomarkers in healthy adults - A pilot randomized controlled trial, Jaskanwal Deep Seingh Sara, Nazanin Rajai, Ali Ahmed, Logan Breuer, Thomas Olson, Wolfgang Kemmler, Takashi Nagai, Nathan Schilaty, Amir Lerman, International Journal of Cardiology, 2025
 - 4- Physiological Effect of Exercise Training with Whole Body Electric Muscle Stimulation Suit on Strength and Balance in Young Women: A Randomized Controlled Trial, Hyeng-kyu Park, Seung Min Na, Se-Lin Choi, Jong-Keun Seon, Wol-Hee Do, Chonnam Med journal, 2021
 - 5- The effects of using electro muscular stimulation (EMS) suits as a type of smart clothes, Eman Raafat Saad, International design journal, 2023

CITATION	Yasser Eid, et al (2025), Designing a suit using Electro muscular stimulation Technology (EMS) to raise physical efficiency and improve vital functions, International Design Journal, Vol. 15 No. 6, (November 2025) pp 307-312
-----------------	--
