

**DEVELOPMENT OF MASSAGE THERAPY DEVICE AND  
OUTCOMES FOR A PERSON WITH LOW BACK PAIN DISEASE**

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**MARCH 2016**

**DEVELOPMENT OF MASSAGE THERAPY DEVICE AND OUTCOMES FOR A  
PERSON WITH LOW BACK PAIN DISEASE**

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A thesis submitted in fulfillment of the  
requirements for the award of the degree of  
Bachelor of Electronic Engineering Technology  
(Medical)

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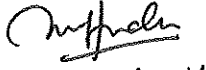
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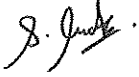
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*Special dedication to my beloved father and mother that always inspire, love and stand beside me, my supervisor, my brother, my beloved friends especially the one who always help me and my fellow colleagues for all your love, care, support, and believe in me.*

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## ABSTRACT

In this current world, back pain is a common problem that affects most of the people and also the society with about 80% of the population facing back pain at some point in their lives. It may be triggered by bad posture while sitting or standing, bending awkwardly, or lifting incorrectly. This project is aimed to develop a device as a low back pain massager with vibration and 'Transcutaneous electrical nerve stimulation' (TENS) in order to help relieve the low back pain. Besides, it is to determine the appropriate level of treatment and the duration of time preferred by the low back person to feel relieve. The product was tested on ten subjects. The device was placed at the low back of the subjects. As for vibration, 3 coil vibration motors were placed on the left and another 3 were placed on the right of low back while for TENS, the electrodes were placed at point 18 and 19 (center of low back) according to the electrode placement guidelines. Then, the subjects chose and tested the vibration from level 1-10 and TENS from level 1-4, according to the time preferred by the subjects to feel relieve from the pain. The vibration and TENS can be used alternatively. The comfortable level of each subject for vibration and TENS were analyzed. All the subjects agreed that this device was successfully developed and helps them to feel relieve from the low back pain. As for vibration, 7 subjects preferred level 10 and 3 subjects preferred level 8 while for TENS, 2 subjects preferred level 4, 5 subjects preferred level 3 and 3 subjects preferred level 2. Furthermore, 7 subjects preferred to use the vibration for 15 minutes and 3 subjects for 10 minutes to feel relieve. As for TENS, 5 subjects preferred 10 minutes, 3 subjects for 8 minutes and 2 subjects for 5 minutes. A low back pain massager is successfully developed and all the subjects gave positive feedback where by the subjects agreed that this product helps them to feel relieve from the low back pain.

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## CHAPTER 1

### INTRODUCTION

#### 1.1 INTRODUCTION

Low back functions as structural support, movement, and protection of certain body tissues. But nowadays, back pain is a common problem that affects most people at some point in their life. It may be triggered by bad posture while sitting or standing, bending awkwardly, or lifting incorrectly. It's not generally caused by a serious condition. In most cases, back pain will improve in a few weeks or months, although some people experience long-term pain or pain that keeps coming back. This study aimed to help the low back pain patient by enhance the back pain massager with little innovation.

## **1.2 PROBLEM STATEMENT**

Back pain is a problem to patients, health professionals and to society. [1] So far, there is no device with combination of vibration and TENS in market. Vibration and TENS device which helps to relieve low back pain can only be get separately in market. As for development of 2 in 1 device with vibration and TENS for low back pain, there is difficulty to determine the appropriate level of treatment and the duration of time preferred by the low back person to feel relieve.

## **1.3 OBJECTIVE**

- a) Develop a device with vibration and 'Transcutaneous electrical nerve stimulation' (TENS) in order to help the low back pain person feel relieve from the pain.
- b) Determine the appropriate level of treatment for the low back pain person.
- c) Determine the duration of time preferred by the low back person to feel relieve.

## **1.4 SCOPE OF PROJECT**

The low back pain massager is mainly scoped for those who have low back pain. It can also be used by normal person as massager. There is no limitation as it is depends on the user or low back pain person's capacity/capability to feel it.



## 1.5 IMPORTANCE OF RESEARCH/PROJECT

The significant of the study/project is to provide a low back pain massager for low back pain person which can help them to feel relieve and for the normal person as a normal massager. Besides, the next intention for the significant of the study is to develop and produce a low back pain massager with vibration and pulse stimulator.

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