

# The Design and Development of Foot Massage Plate from Coconut Shell

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**Abstract**—The objectives of this research were to design and develop foot massage plate from coconut shell. The research investigated on the satisfaction of the users on the developed foot massage plate on 4 aspects; usage, practical in use, safety, and materials & production process. The sample group included 64 people joining the service at Wat Paitan Health Center, Bangkok. The samples were randomly tried on the massage plate and evaluated according to the 4 aspects. The data were analyzed to find mean, percentage, and standard deviation. The result showed that the overall satisfaction was at good level (mean = 3.80). When considering in details, it was found that the subjects reported their highest satisfaction on the practical usage (mean = 4.16), followed by safety (mean = 3.82); then, materials and production process (mean = 3.78). The least satisfaction aspect was on function and usage (mean = 3.45) or moderate level.

**Keywords**—Coconut Shell, Design, Foot Massage, Foot Massage Plate.

## I. INTRODUCTION

WITH the quick pace of life, Thai people change their life style and eating habit. They consume more fast food, lack exercises, work hard and not enough good leisure and recreation. They spent most of their time in the office with wrong sitting posture resulting in back pain, backache, headache, neck ache, leg pain, etc. There are several ways to cure those symptoms such as taking medicine, massage, acupuncture, acupressure, etc. One of the popular curing ways in our country is massaging. Massaging means the way of curing through pressing, rubbing or kneading of parts of the body especially to aid circulation, relax the muscles, or provide sensual stimulation. Thai massage has been a valuable local wisdom for curing for a long time [1]. Foot massage is a kind of massaging therapy based on Foot Reflexology to stimulate internal organs of the body and adjust the balance of the body to the normal condition [2].

Foot massage is vital because foot supports the whole weight and organs of the body. Moreover, it is believed that there is a zone therapy beneath the ball of the foot at which reflexes internal organs of the body. Based on Foot Reflexology, foot massage can stimulate internal organs, circulate blood system, and relief pains of every part of the body. Patients with pain such as bone disease [3]-[5] can ease their pain from foot massage.

Nowadays, there are several types of foot massage such as

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by hand or using devices. Foot massage tool created by Thai wisdom is the use of a half coconut shell for the patient to step on [6]. Our country is famous for coconut plantation and the 6<sup>th</sup> of the world coconut plantation and products. The coconut products include the coconut juice, coconut oil, coconut sugar, coconut shell, and fibers from coconut. The researcher had an idea to use coconut shell which is the left-over material and is available everywhere to develop a massage plate which can relief pain based on Foot Reflexology.

## II. OBJECTIVES

1. To design and develop a massage plate from coconut shell.
2. To make a prototype of the massage plate from coconut shell.

## III. METHODOLOGY

### A. Research Procedure

The research on design and development of foot massage plate from coconut shell started from collecting information related to the massage and the product design. The information was in the form of primary and secondary research. The data analysis was conducted to find the quantitative result in the form of percentage, mean, and standard deviation together with the qualitative analysis to get the valid data for the design of a massage plate from coconut shell. The design stage consisted of drawing the 1<sup>st</sup> draft of the massage plate, developing the model, creating the prototype, trying out the developed model, improving the model, and then, evaluating the product [7]. Sample group in this study included: 64 people joining the service at Wat Paitan Health Center, Soi Pahonyothin 15, Samsennai, Phayathai District, Bangkok. The samples were randomly tried on the massage plate and evaluated according to the 4 aspects.

### B. Research Tool

Research tools in this study included massage plate made from coconut shell and evaluation forms to evaluate users' satisfaction on the developed massage plate on 4 aspects; usage and functions, practical in use, safety, and materials & production process. The satisfaction level was divided into 5 levels, i.e.:

- The highest satisfaction level was at 4.50-5.00
- The high satisfaction level was at 3.50-4.49
- The average satisfaction level was at 2.50-3.49
- The low satisfaction level was at 1.50-2.49
- The lowest satisfaction level was at 1.00-1.49

The analysis of the quantitative data was conducted to find percentage, arithmetic mean, average, and standard deviation.

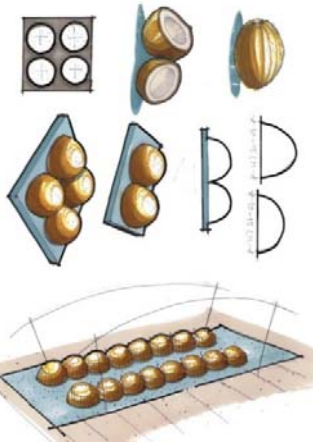


Fig. 1 Drawing of the massage plate from coconut shell

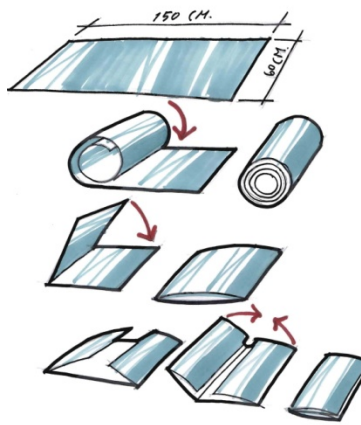


Fig. 2 The massage plate that can be folded

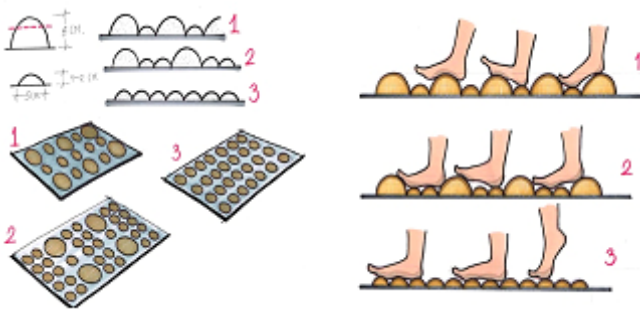


Fig. 3 Drawing of the massage plate from coconut shell

#### IV. RESULTS

At the trial stage, the users tried on the developed massage plate with the results shown in Table I.



Fig. 4 The prototype of the massage plates

TABLE I  
 DEMOGRAPHIC INFORMATION OF THE SUBJECTS

General information		Number	Percentage
Gender	Male	46	71.88
	Female	18	28.12
Age	Lower than 30	12	18.76
	Between 30-39	23	35.93
	Between 40-49	15	23.43
	Between 50-59	12	18.76
	More than 60	2	3.12
Occupation	Government official	18	28.12
	Employee	22	34.37
	Merchant	24	37.51
Symptoms	Pain in the knee	9	14.06
	Pain in the leg muscles	25	39.06
	Pain at the calf	10	15.62
	Neck ache	5	7.81
	Shoulder ache	3	4.68
	Back ache	8	12.51

It can be seen from Table I that most of the subjects were male (46) with the age between 30-39 (35.93%) followed by 40-49 (23.43%). Most of them (37.51%) were merchants, followed by employees (34.37%). They reported their pain mostly on leg muscle ache at 39.06%, followed by the pain at the calf of the leg (15.62%).

It can be seen from Table II that the users reported high satisfaction in a whole at the average of high level (mean = 3.80). When considering in details, it was found that the highest satisfaction was on the practical in use (mean = 4.16) followed by safety (mean = 3.82), then, on the materials & production process (mean = 3.78). The users reported average satisfaction on the usage and function (mean = 3.45).

TABLE II  
 USERS' SATISFACTION ON THE MASSAGE PLATE MADE FROM COCONUT SHELL

Aspects	Mean	SD	Satisfaction level
Usage and functions	3.45	0.56	Average
Practical in use	4.16	0.56	High
Safety	3.82	0.74	High
Materials & production process	3.78	0.82	High
Total	3.80	0.67	High

#### V. CONCLUSION

The results of the users' satisfaction on the developed massage plate were high because of its practical in use, safety, and pain relief. Moreover, the developed foot massage plate is easy to be carried everywhere because of its compact size. It

can be used with both standing and sitting position. It is easy to make and the material is available in the local area; so, it can be produced with low cost in the community.

Suggestion for this study is on the comparison of the user's health before and after. There should be a comparative study on the health of the subjects before and after using the massage plate to find its effectiveness and its effect on the users' health. The results can be used to develop the massage plate from coconut shell to cure a certain illness effectively.

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