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Comparative study on the effect of back massage to body heat by tools

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도구에 따른 등마사지가 체열에 미치는 영향의 비교연구

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Abstract This study aims to examine the effects of massages using various tools being frequently applied in skin care centers. It suggests the most effective method based on the comparative analysis on the body heat changes before and after the massages and also provides foundational data to develop back treatment programs. This research conducted manual, ultrasonic device, and also suction massages from July 3rd till 10th, 2011 to women at the age of 35 to 45 living in Gwangju, Jeonnam. And five of them were arranged for each tool. The body heat changes before the massages and after the 20-minute massages were measured with the body heat diagnostic device of thermograph DITI IRIS-XP. The collected data went through the t-test using SPSS 18.0. According to the result, the body temperature increased significantly before and after the manual massage from 30.82±0.52 to 35.06±0.36 ($p<.001$). The body temperature also increased significantly before and after the ultrasonic massage from 30.66±0.53 to 35.14±0.39 ($p<.001$). And the body temperature increased significantly before and after the suction massage from 30.93±0.47 to 39.25±0.19 ($p<.001$). The hand, ultrasonic device, and also suction were all effective as massage tools in terms of increasing body temperature, and the suction massage was shown to have the greatest effect in body temperature increase. Thus, the suction was analyzed as the most effective tool to be used to develop back treatment programs.

요 약 본 연구는 피부미용실에서 많이 적용하고 있는 다양한 도구를 이용한 등마사지의 효과를 알아보고자 하였으며 마사지 전후의 체열변화를 비교분석함으로 가장 효과적인 방법을 제시하여 등관리 프로그램을 개발하는 기초자료를 제공하고자 하였다. 수기와 초음파기, 석션기를 이용하여 각각의 도구에 5명씩의 35세에서 45세 사이의 전남 광주시에 거주하는 여성들에게 2011년 7월 3일부터 7월 10일까지 시행하였다. 마사지전과 20분간의 마사지 시행후 각각 체열변화를 체열진단기 DITI IRIS-XP로 측정하였다. 수집된 자료는 SPSS 18.0 program을 이용하여 t-test를 실시하였다. 그 결과는 수기마사지전 30.82±0.52에서 수기마사지후 35.06±0.36로 체온상승이 유의하게 나타났고($p<.001$), 초음파 마사지전 30.66±0.53에서 초음파 마사지후 35.14±0.39로 체온상승이 유의하게 나타났으며($p<.001$),석션마사지전 30.93±0.47에서 석션마사지후 39.25±0.19로 체온상승이 유의하게 나타났다($p<.001$). 수기와 초음파기, 석션기는 마사지 도구로서 체온상승에 모두 효과적이며 특히 석션기를 이용한 마사지가 체온상승에 가장 효과가 높은 것으로 나타났다. 따라서 석션기는 등관리 프로그램을 개발하여 활용하는 가장 효과적인 도구인 것으로 분석되었다.

Key Words : Massage tools, Back treatment, Thermograph, Temperature rise

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1. Introduction

It has become the ultimate goals of humanity to recently improve the quality of life and persue the happiness of individual. For this, efforts and ways to preserve and maintain health which is the most basic have also been varied and high-tech. Massage is already popular and known widely as the most acclaimed therapy for health and beauty. General opinion is that massage influences physiological effects such as muscular, nervous, skeletal, circulatory

sensory and immune systems and It changesthe permeability of cell membranes, stimulatemuscular metabolism through smooth regulation of blood circulation[1], improves motor skills by eliminating more quickly body wasted from muscular fibers, the ability of the muscular activity indicates 3-5 times[2]. Back massage is easy to access and selected site due to a lot of tired muscles. Circulation becomes smooth by relaxing the rigor of the muscles as loosening the tension through back massage and the movement of oxygen and nutrients that all somatic tissues and organs need facilitates and it can help to purify toxins and impurities out of the body[3].

Heat emitted from the body is a physical quantity with a very clinically important meaning, it has become an important indicator that estimates the relationship between temperature and disease from ancient times [4]. Skin temperature is determined by bloodstream of small blood vessels located just 5mm be low the surface of the body. Skin temperature is considered to be influenced the most from sympathetic nerve function and the activity of the muscles[5], giving the proper stimulus to skin through massage, it facilitates bloodstream toward internal organs and plays an important role in body heat control because many vessels and verves in the skin are so close[6].

The body heat is difficult to measure due to the curvature but digital infrared whole body heat device to shoot from a comfortable position without having to touch the body due to the development of optical technology and computer was able to accurately measures temperature[7]. This is to detect the minute infrared rays emitted naturally from the skin surface and the test to diagnose physical presence as a computer indicates the minute from the body heat changes on the site of pain on the body and others disease by color [8]. The information is changed continuously detecting the body heat, imaged, charted and stored on the computer and in case the body heat is highter, close to red color image appears as color zone is from black to red.

Recently, in Korea, researches are being actively conducted regarding skin care and body heat changes and also its tools[7-13]. However, researches that deal with the effects of massage tools being actually applied in the spots of skin care are very rare. Thereupon, this study aims to examine the effects of massages using tools and also suggest the most effective method through comparative analysis on the body heat changes before and after the massages. Also, effects on blood circulation and body heat are investigated through the massages by tools and they're used as the basis data on practical application of the study.

2. Methods

2.1 Study design

This study is designed to measure body heat of the subjects as a thermography in advanced and carry out back massage using hand, ultra sound and vacuum suction, and it's designed as a post body heat measurement.

2.2 Study objects

Back massage is done to each 5 persons by tools as 35's and 45's female objects who lives in Gwangju, Jeonnam in Oriental Institute in Changxing, Jeonnam during July 3 -July 10. Regarding the number of subjects for the experiment of skin care, this study adopted the experiment with five subjects for each, and there have been many researches taking their subjects of 4 to 8 similarly to this[4,9,10,12,14-16]. They don't have disease to influence changes in temperature during the study period and understand the purpose of the study and accept the participation on the study and then thermography was carried out before the experiment and after back massage for 20 min.

2.3 Study methods and tools

Thermography and the massage were carried out in the

room maintained as the same place, environment and temperature- 23~24°C, humidity-60%. The subjects have the same conditions on age or body type, health status, etc. They get massage as the same pressure and time, manner and temperature measurement of the body surface was shot in the back of the same places, location before and after the massage.

2.3.1 Hand Massage

Hand massage was re-designed for the purpose of this study based on Anh, Kyung Min[8] technique. Swedish massage was performed on the total back as a medium pressure and velocity for 20 min focusing on trapeziu and erector spinae musecules. Natural DNC Sensillo Detox oil was used.

2.3.2 Ultrasound machine

The frequency of ultrasound machine, 1-1.8 million per second frequency is adequate to the skin and fine high-speed massage takes place in deep of the organization[14]. It makes the skin temperature rise through physical process in the body, facilitate blood and lymphatic circulation and helps beauty and health[10]. Ultrasonic waves massages was performed for 20 min after coating on the back with oil.

2.3.3 Vacuum suction

Vacuum suction consists of suction cups and facilitate repeating push, pull, drag action by using electricity on the adsorbed state of the skin as an original Buhang principle[18]. Management purpose of Vacuum is to speed up the flow of lymph and blood and raise basal metabolic rate and help to stimulate the body's tissues and circulate them by relocating cells as moving the skin tissue under cups on the pre-coated back with oil [13].

2.3.4 Thermography

DITI(Digital Infrared Thermal Imaging) is used as IRIS-XP, Seoul, Korea) of Medicore co.kr.It's the test to evaluate objectively through infrared imaging and computer analysis for subtle changes in body temperature. Light and heat outside were blocked and where constant humidity and temperature is maintained was shot and compared to analyse. The temperature of the surface has difference depending on the manufacture's representation but used machine in this experiment was divided into 8 different colors (red, scarlet, gold, yellow, green, blue, purple, black). Black is the lowest as14.50°C and red is the highest as 40.00~38.41°C.

2.4 Data analysis

Collected data from the experiment process was analyzed using SPSS 18.0 program, before and after the experiment (after 20 min) was analyzed as paired sample t-test (pair comparison), independent sample t-test was used in changes in body temperature of hand and apparatus.

3. Results and Discussion

3.1 General characteristic of objects

About general characteristics, age was the same all in the three groups as 60% of 35 to 40 and 40% of 41 to 45. And about their marital status, in the manual massage group, the married were 60% and the unmarried were 40%. And both in the ultrasonic device group and the suction group, the married were 80% and the unmarried were 20%. And about their average height, the manual massage group was 159.20 (3.56), the ultrasonic device group was 159.00 (3.81), and the suction group was 160.00 (2.55). And about their weight, the manual massage group was 53.60 (3.21), the ultrasonic group was 51.80 (3.03), and the suction group was 52.80 (1.64)[Table 1, Table 2]. Regarding the general characteristics, the three groups chose similar subjects for the experiment.

[Table 1] General characteristic of objects

Division		Hand		Ultrasonic		Suction	
		Frequency	%	Frequency	%	Frequency	%
age	35~40	3	60.0	3	60.0	3	60.0
	41~45	2	40.0	2	40.0	2	40.0
marital status	married	3	60.0	4	80.0	4	80.0
	unmarried	2	40.0	1	20.0	1	20.0
Total		5	100.0	5	100.0	5	100.0

[Table 2] Body weight and Height

Division	Hand(n=5)	Ultrasonic(n=5)	Suction(n=5)
	M(SD)	M(SD)	M(SD)
height(cm)	159.20(3.56)	159.00(3.81)	160.00(2.55)
weight(kg)	53.60(3.21)	51.80(3.03)	52.80(1.64)

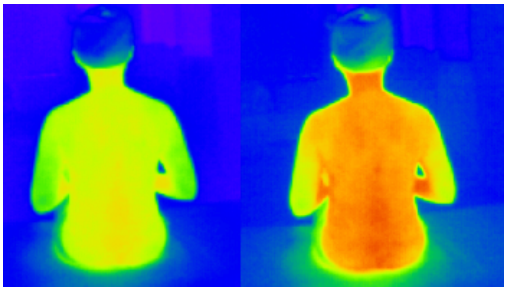
3.2 Changes in the body heat of massage by tools

Conducted t-test results are shown in Table 3 to check changes in the body heat before and after hand massage of the subjects. The body surface temperature of five subjects before the experiment was 30.82±0.52°C and it turned into 35.06±0.36°C after the experiment ($p<.001$).

[Table 3] Changes in the body heat before and after hand massage

division	before	20min	t
	Mean±SD	Mean±SD	
body neat	30.82±0.52	35.06±0.36	-25.80***

*$p<.05$, ***$p<.001$



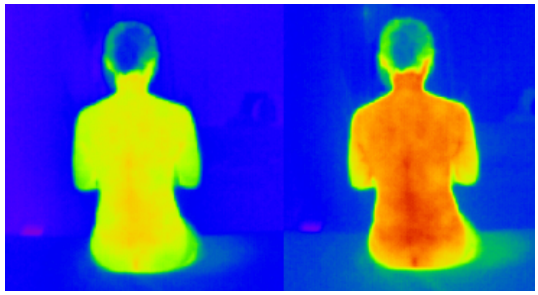
[Fig. 1] Change in the body heat before and after hand massage

Conducted t-test results are shown in Table 4 to check changes in the body heat before and after ultrasound massage. The temperature of five subjects before the experiment was 30.66±0.53°C and turned into 35.14±0.39°C significantly after the experiment ($p<.001$).

[Table 4] Changes in the body heat before and after ultrasound massage

division	before	20min	t
	Mean±SD	Mean±SD	
body neat	30.66±0.53	35.14±0.39	-41.18***

*$p<.05$, ***$p<.001$



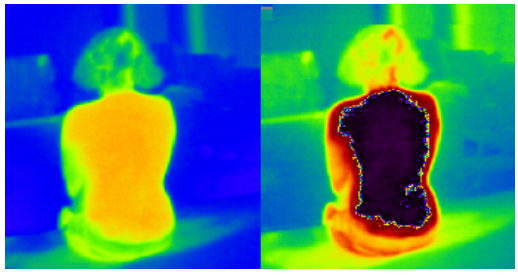
[Fig. 2] Change in the body heatbefore and after ultrasound massage

Conducted t-test results are shown in Table 5 to check changes in the body heat before and after suction massage. The temperature of them before the experiment was 30.93±0.47°C and turned into 39.25±0.19°C significantly after the experiment ($p<.001$).

[Table 5] Changes in the body heat before and after suction massage

division	before	20min	t
	Mean±SD	Mean±SD	
body heat	30.93±0.47	39.25±0.19	-45.70***

*$p<.05$, ***$p<.001$



[Fig. 3] Change in the body heat before and after suction massage

Above three massages indicated they could be confirmed as effective methods to raise the temperature of the surface body ($p<.001$)

In comparison with previous studies to measure temperature rise as the body heat depending on the effect of massage, it's reported to be effective in Jang, Mi Gyeong's [12] study on the effects of foot massage to blood and body surface temperature. Park, Gyeong Soon · Kang, Su Gyeong's[5] study on facial skin temperature

by applying facial massage, Jin, Kyung Hee · Kim, Myeoung Suk[8], Chae, Su Hyung's[20] study on the effect of back massage using aroma therapy to body heat and mood and the results of this study were consistent.

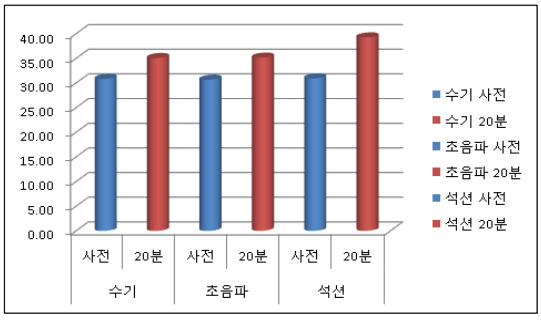
3.3 Changes in the body heat before and after Hand · Ultrasound · Suction massage

When hand massage was compared with ultrasound massage, the changes in the body heat didn't show significantly before and it didn't show significantly after. However, when hand massage was compared with suction massage, ultrasound massage was compared with suction massage, the changes in the body heat showed significantly before and it's the same after (Table 6. Fig. 4)

[Table 6] Change in the body heat before and after hand and apparats(ultrasound, suction)

division		hand/ultrasound		hand/suction
		t	p	t
body heat	before	.48	.641	-.34
	20min	-.32	.758	-22.76***

*p<.05, ***p<.001



[Fig. 4] Change in the body heat before and after hand and apparatus

Comparative study on changes in the body heat is not properly made out according to the massage tools. Chae, Su Hyung · Kim, Ae Gyeong · Park, Seon Min[21] reported the meridian massage was more 2.02°C than ultrasound massage in the comparative study on effect of ultrasound, meridian massage to body heat. Jeong, Su Hwan's study[22] on the effect of the massage according to stimulus intensity is to show a significant increase in the body heat on weak and medium intensity massage and weak intensity shows a larger variation then medium and strong intensity on the results of comparing the variations. Meridian massage was more effective than ultrasound massage on the body heat rise on Chae, Su Hyung's study so it showed different results from this study. Weak intensity massage was more effective on the body heat rise so it showed conflicting results.

In fact, researches on the massage using a suction are very rare, and even researches on the body heat changes after the suction massage are almost none. And about the manual and ultrasonic device massages, as in other researches, both showed effects in body temperature increase after the massages. This could not compare the body temperature increase of the suction massage with other researches since there is none, so it is needed to conduct more follow-up research on it.

4. Conclusions and Recommendations

This study was to investigate that the massage using hand and ultrasound, suction have an effect on the body surface temperature were applied to subjects, DITI IRIS-XP are used to examine the relationship between massages and the skin surface temperature, the results were as follows.

1) The body surface temperature of 5 subjects was 30.82±0.52°C before hand massage and turned into 35.06±0.36°C significantly (p<.001). The body surface temperature of 5 subjects was 30.66±0.53°C before ultrasound massage and turned into 35.14±0.39°C significantly (p<.001). The body surface temperature of 5 objects was 30.93±0.47°C before suction massage and turned into 39.25±0.19°C significantly (p<.001).
2) When comparing hand massage and ultrasound massage on the changes in the body heat, there was not significant difference before and after. However, when comparing hand and suction massage, ultrasound and suction massage on the changes in the body heat, there were not significant differences before but significant differences after (p<.001). From the above results, the effect of massage was verified as indicating temperature rise after hand and ultrasound, suction massage. In

comparing hand and ultrasound massage, suction massage was proved to be the most effective way as indicating temperature rise highly.

This study was to prove massage effect by investigating the skin surface temperature changes applying the massage by tools, based on the results, the following suggestions should be. First, massage techniques and the skin surface temperature rise effect should be proved consistently. Second, it's necessary to study that the same effect is repeated on other parts as well as back. Third, the study on temperature rise effect according to the intensity should be identified. Also, massage should be used as an effective management through scientific and systematic training with continued research.

References

[1] Choi, Jun Ho · So, Gwang Seop, “Applied physical characteristics and utilization of nfrared waves”, The Korean Society of Thermology, Vol. 1, No. 1, pp. 18-25, 2001.

[2] Jeong, Dong Hyeok, “The search for therapeutics sports massage in sports medicine”, Sport Science, Vol. 26, No. 1, pp.475-486, 2003.

[3] Jin, Kyung Hee · Kim, Myung Sook · Chae, Su Hyung, “The Effects of the Aroma Back Massage that Influencing on Body Temperature and Emotional Condition”, J. Kor. Soc. Esthe & Cosm. Vol. 2, No. 4, pp. 5-18, 2007.

[4] Lee Seung Hee, “The Effect of Manual Therapy on the Change in Skin Elasticity,” Master’s thesis submitted to Graduate School of Cosmetic Science, Kwangju Women’s University, 2005.

[5] Park, Yeong Jae · Park, Yeong Bae, “Oriental clinical applications of Thermography”, The Korean Society of Thermology, Vol. 1, pp.26-31, 2001.

[6] Yoon, Young Suk, “Thermographic temperature changes by the Meridian massage on the female of 6th decade", The Korean Society for Aesthetics and Cosmetics, Vol. 3, No. 1, pp. 121-146, 1997.

[7] Oh, Gang Su, "Change of Body Heat and Hormone after Scalp Massage", J. Kor.Soc.Cosm. Vol. 15, No. 3, pp. 757-765, 2009.

[8] Park, Jeong Sun, “The effect of hand therapgy to skin surface temperature changes”, graduates school of Beauty Science Kwangju Women Uni, Master's thesis 2006. [5] Seong, Gi Seok, “Massage Therapy Manual”, DK Books: Seoul, 2005.

[9] Kim, Lan, Kim, Han Shik, “The Effect of Massage Techniques on Skin Conditions of Face,” Korean Aesthetic Society, 6(2), p.95-105, 2008.

[10] Kim, Seong Hee, "A Stude on the effects of facial massage using Color therapy and Ultrasonic waves on women in the 20's skin condition changes", graduates school of Seo Kyeong University, Master's thesis, 2011.

[11] Ahn, Kyung Min, "A Study on Regulation Effect of Sebum · Moisture and Reduction of Ederma in Face by Combination of Manual & Jade Massage", of Wonkwang University PhD thesis, 2010.

[12] Jang, Mi Gyeong, “The effect of foot massage to skin temperature and body heat”, Dongshin Uni, Master's thesis 2005.

[13] Jeong, Seon Hwa, “Effects of High Frequency Treatment and Vacuum Suction on the Body Fitness", graduates school of Engineering Konkuk University, Master's thesis 2008.

[14] Kang, Su Jeong, "The effect of facial massage using ultrasound on skin condition change of women in their 40s and 50s", graduates school of Seo Kyeong University, Master's thesis, 2010.

[15] Lee Sang Hun, Baek Yong Gwan, Lee Ho Gyun, Kim Jong Min, “Three examples of skin ulcer healed with low power laser”, Dept. of Dermatology of Hallym University College of Medicine, p.158, 2009.

[16] IIunter J, et al., Laser Surg. Med., 3, 285, 1984.

[17] Choi Hyeon Gyeong, Lyu Ji Young, Im Gae Hwa, Choi Tae Bu, Im Mi Hae, “The Effect of High-Frequency Care and Ultrasonic Care on Pigmentation and Wrinkles,” Korean Aesthetic Society, 6(3), p.11-19, 2008.

[18] Kim, Geyong Sun, "The study is that meridian massage have influenced on physical and biochemical changes of women who are overweight in the lower body", graduates school of Seo Kyeong University, Master's thesis, 2006.

[19] Park, Gyeong Sun · Kang, Su Gyeong, “Changes in facial skin temperature by facial massage”, The Korean Society for Aesthetics and Cosmetics, Vol. 7, No. 3, pp. 1-7, 2009.

[20] Chae, Su Hyung · Kang, Tae Kyeong · Min, Myung Yi, "A Study on the Effect of Supersonic Waves Massage on the Circulation of Blood", Kor. Soc. Esthe & Cosm, Vol. 6, No. 1, pp. 35-42, 2006.

[21] Chae, Su Hyung · Kim, Ae Kyung · Park, Sun Min, "A

Comparative on the Effect of Supersonic Waves and Meridian Massage on Body Heat", Kor. Soc. Esthe & Cosm, Vol. 2, No. 1, pp. 33-45, 2007.

[22] Jeong, Soo Hwan, "Effects of Massage As Different Intensities of Stimulation", Keimyung University Department of Physical Education Graduate School, Master's thesis, 2009.

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