

## The Effect of Silver Spike Point Therapy(SSP) that applied to Acupoints on the Blood Flow Rate of Internal Carotid Artery and Pain Relief of Headache Patients

The aim of this is to examine the effects of SSP therapy on the internal carotid arteries blood flow of 24 tension type headache patients(study group) and non tension type headache patients(control group), and on the reduction of their headaches, when applied to the acupuncture points.

It stimulated the acupuncture point of headache 6 place with the SSP. It measured VAS and the blood flow of the internal carotid arteries with TCD.

When the internal carotid arteries blood flow of study group and control group were compared by period, a significant difference was found in the 4th period( $p < .05$ ). When the Visual Analog Scale of study group and control group were compared by period, a significant difference was found in the 4th period( $p < .05$ ). The comparison of each measurement result of the internal carotid arteries blood flow of the study group found significantly increased. The comparison of each measurement result of the VAS of study group found significantly decreased. With regard to the control group, the VAS significantly decreased.

The silver spike point low frequency electrical stimulation treatment, when applied to the acupuncture point, can significantly influence the internal carotid arteries blood flow of headache patients and can significantly reduce their headaches.

Key words: *Tension type headache; TCD; SSP; Internal carotid artery.*

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## INTRODUCTION

A headache is one of the most common physical symptoms of a body, and so it is not too much to say that everybody experiences it one more in his life. According to the statistics of several researchers, it has been reported as high as that the rate of headache patients among civilian populations is 40~65%(1).

A tension type headache is the most common type among several kinds of headaches. Even though its frequency and duration is diverse, the symptom generally shows everyday and persists for from several hours to several months. The exact pathogenic cause of this headache has not been discovered, but it is dominant that the constant muscular contraction of a cranial bone and muscles of neck causes it.

IHS(International Headache Society) defines that a

tension type headache is non-pulsatile pain like pressing or tightening by a band, the intensity of the pain is mild or moderate, it causes a trouble in a daily life but it's not serious and it does not get worse in a daily activity like going up and down the stairs. Also, it may cause increased tenderness of the peripheral muscle of a cranial bone suggested by palpation or tender points(2, 3, 4, 5).

If the muscles of head and neck are constantly contracted by stress, overstrain, tension and etc., in general, a peripheral nerve and blood vessel passing through muscles according to the effect of muscular contraction are pressed. At this time, the stimulated peripheral nerve which is delivered to CNS is regarded as pain. Thereafter, press of a blood vessel causes the depression of blood flow and the oxygen in muscles becomes insufficient. Such status makes a hazardous

substances which causes pain.

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On this occasion, such hazardous substances cannot be effectively removed by the fall of blood flow rate and then become accumulated. Such accumulated hazardous substances stimulate a peripheral nerve again and finally, the vicious circles which induces pain persist again. Generally, such tension type headache takes about 70~80% of headache patients and is very common as much as almost people experience it once more in a lifetime. Accordingly, the pathogenesis of tension type headache are done by the combined action of contractile factor of cephalic and the peripheral muscles, vascular factor and psychological factor(6).

In the meantime, a tension type headache is caused by fatigue, stress, anxiety and noisiness and in most cases, it accompanies depression or anxiety syndrome. The patients are under tension state, and the headache generally accompanies muscular contraction(7). Constant involuntary muscular contraction has been regarded as an important cause of pain of a tension-type headache. Such abnormality induces the tenderness and myofascial pain of muscle. As physiologic mechanisms that it is able to induce myofascial pain by the response recorded from the intensity of mechanical pressure and a sensory neuron applied to deep tissues via an animal experiment, the sensitization of peripheral myofascia nociceptor, the sensitization of 2nd neuron in the level of a spinal cord or a trigeminal nerve, sensitization of supraspinal neuron and abnormal control of endogenous descending pain control system which is an anti-nociceptional action decreased from the structure of supraspinal cord were suggested(8).

A tension type headache is the most common a headache among primary headaches without a structure lesion in a cranial cavity. It is caused by the constant contraction of head and neck and is named because its causes are emotional tension, stress, etc. Such causes form conditions of patients through complex connection of several factors. So, it is difficult to have an instant effect by a mono therapy.

According to overseas studies, about 40% of adult population experience headache daily. It has been

reported that 14%~31% of a male and 28~44% of a female complain a frequent and painful headache and more than a half of university students(52%) experience it minimum once or twice a week. Headache is generally classified into a migraine headache, a tension type headache and the headache that a migraine headache and a tension typed headache are mixed in accordance with clinical manifestation, psycho-physiological base and psychological characteristics.

In the recent researches, a tension type headache is closely connected with a migraine headache and has been regarded as one of independent diseases. For ecological and pathological model of a tension type headache, it is caused by a central factor like the change of algescic nervous track on a limbic system and brain stem and a peripheral factor such as the increase of the sensitivity of myofascial pain and hypertonia(9, 10).

In the viewpoint of oriental medicine, a meridian pathway means a pathway where air ebolism moves and to connect every place of a body.

A meridian has a meaning of 'a way' and connects the inside and the outside of a body by moving lengthways, a vein has a meaning of 'a net', is thinner and smaller than a meridian and is distributed all over the body by moving mainly crossways. Acupoints are distributed by a certain principle, the place where the external energy out of a body, a meridian pathway and the energy of organs are circulated one another and a reaction and treatment point which let know the existence of a disease via pain, change of skin color and etc. The effects which can get by stimulating an acupoint are treatment of a disease, prevention, normal recovery of physiological functions, analgesic action and so on(11).

There are several treatments according to symptoms, regions and causes for acupuncture of a headache, and Park reported that the main acupuncture described in the Huang Di Nei Jing and Chimgugapelgyeong is Shunjing-quxue Needling and recently, treatment according to regions has frequently adopted(12). According to the study of Kang et al., a headache has about 101 main regions of acupuncture, it has been frequently used in the order of Baik-Hoi(GV20), Hap-Gok(LI4), Poong-Ji(GB20), Du Yu(ST8), Pung Bu(GB16), Tai-Yang(Ki-Blood), Sang-Seong(GV23) and it has been used in the forder of a cystoscope, Gallbladder Meridian, Du Meridians, the Red Meridians, Gastroscope for the freuency according to a meridian pathway for a headache(13). Also, the study of Park et al. said that Hap-Gok(LI4) and Yeol-Gyeol(LU7) are the common region of acupuncture(14). As a result of combination treatment of acupuncture and auricular acupuncturing, Kim et al. reported that total

effectiveness ratio was 74.7% and the more frequency of treatment, the higher the curative effect.

An acupuncture applies to a certain acupuncture locus and the selection of an acupuncture locus is of great importance for its treatment. Lee et al. reported that the frequency of bellicosity of herbal therapy for a tension type headache was 81.3%(7).

SSP(silver spike point) therapy means surface acupuncture point stimulation therapy which practices low frequency current therapy by arranging SSP electroide on effective point(vitals), and surface acupuncture point stimulation therapy is called transcutaneous electrical acupuncture point stimulation therapy(15).

The theoretical background of SSP therapy is an acupuncture and it is often called needless acupuncture because it can get the similar stimulatory effect to the case inserting a needle by applying pressure stimulus to an effective point(16).

Meanwhile, the change of blood flow rate in a migraine headache caused by a vasogenic headache focusing on the treatment of the trigger point of pain in curing a tension type headache has been studying. On the other hand, it is rare to study the change of blood flow rate for a tension type headache.

For all that one of the most common headaches is a tension-type headache, its patho-physiological study has been extremely restricted, and actually, the exact mechanism cannot be suggested. The reason why the pathophysiology or mechanism has not been studied is because mental stress and tension were frequently in most of tension type headache patients(1).

This study tries to compare and analyze the changes of CBF(cerebral blood flow) rate and the effectiveness of pain relief between tension type headache patients and nontension type headache patients when stimulating the acupoint for a headache with SSP Low Frequency Electrical Stimulation which is a therapy to show the same analgesic effect as an acupuncture based on an oriental physical therapy.

## METHOD

### Subjects

The subjects of this study are an experimental Group(12 tension type headache patients) and a control group(12 non tension type headache patients).

① An experimental group consists of the person

who is classified into an episodic tension type headache or an episodic tension type headache related to muscular disorder around a skull in accordance with ICHD-II(international classification of headache disorder) of IHS.

② A control group consists of non tension type headache patients except for an experimental group in accordance with ICHD-II of IHS.

③ Both an experimental group and a control group consist of headache patients aged 20 to 40.

④ A person without a disease like Anemia and hyper-thyroidism that it is able to affect a cerebral blood flow rate.

⑤ A person without a specific trauma.

⑥ A person without an abnormal finding for a physical and neurologic examination.

### Measurement Instruments

#### TCD(transcranial doppler ultrasonography)

TCD is an experiment tool to evaluate the epidemiological change of blood flow in a cranial cavity by measuring the speed and direction of blood flow in a cranial cavity with a non-invasive method using Doppler's effect.

A transmandibular approach measures a pulse of an internal carotid artery on the lower part of a mandibula after making the jaw of a patient lying on his back raise slightly and then examined it after putting a probe on the site. This site is directly examined on a skin without permeation of a bone. So, if an experimenter presses the site forcibly, the blood flow rate can be fast. Therefore, an experimenter has to place slightly a probe when examining it. An experimenter measures ICA(internal carotid artery) using a 4MHz probe.

#### SSP(silver spike point)

This study stimulated acupoints for a headache using SSP - one of low frequency electrical stimulation therapies - to show the same analgesic effect as an acupuncture based on an oriental physical therapy.

#### VAS(visual analogue scale)

This study used VAS which has been used the most frequently for the purpose of objectification of subjective pain that a patient feels. VAS is to mark directly the appropriate pain intensity of a subject on a 100mm sized horizontal bar on the time when the pain has stopped.

## Procedure

This study had carried out SSP therapy to 6 headache acupoints of 12 tension type headache patients(an experimental group) and 12 non tension type headache patients(a control group) three times a week for 3 weeks and had measured the blood flow rate of an internal carotid artery using TCD and checked a pain intensity using VAS once a week.

6 headache acupoints are Hap-Gok(LI4: the concave site of muscle between metacarpal delta phalanx of a thumb and a forefinger) of Large Intestine Meridian, Du-Yu(ST8: the place where a hair grows out on the outside of forehead, about 10cm site from the center of the forehead to the outside) of Gastroscop, Tai-Yang(Ki-Blood : about 2~3cm site from the center between the lateral end of eyebrows and the lateral site of eyes to the backside) - air embolism, Wan-Gol(GB12 : the concave site of the rear of a mastoid) of Gallbladder Meridian, Gyeon-Jeong(GB21 : the central site between a clavicle of trapezius muscle and a shoulder joint) of Gallbladder Meridian and Yeol-gyeol(LU7 : Top site of about 5~10cm from the upper wrist on the upper site between a thumb and a forefinger in the medial radius) of Lung Meridian. For electric stimulus, SSP had been practiced under the conditions of 50 $\mu$ s phase duration and 200mmHg adsorptive power of a silicon pad three times a week for 3 weeks.

Once electrical stimulation duration was fixed as 30 minutes. Also, this study practiced SSP therapy by raising a current intensity(10~25mA) up to the sting threshold as much as that a subject was able to endure within the scope that the visible contraction of a muscle does not occur.

If subjects visit a hospital, their exclusive nurses practiced them TCD examination after having a rest for 5 minutes at TCD laboratory. A transmandibular approach measures a pulse of an internal carotid artery on the lower part of a mandibula after making the jaw of a patient lying on his back raise slightly and then examined it after putting a probe on the site. This site is directly examined on a skin without permeation of a bone. So, if an experimenter presses the site forcibly, the blood flow rate can be fast. Therefore, an experimenter has to place slightly a probe when examining it. An experimenter measures ICA(internal carotid artery) using a 4MHz probe.

The subjects were galvanized SSP acupoints for 30 minutes, moved to TCD laboratory, took a rest for 5 minutes and then were examined by TCD inspection again. This study had measured CBF rate for each cerebral rovascular and compared the change by

measuring total 4 times for 3 weeks.

Also, VAS had made a patient mark directly the pain intensity on the probe shown in stages from silence(0) to unbearable pain(10) on the time when the pain has stopped. Such pain intensity had been measured total 4 times such as first visiting to a hospital, 1 week, 2 weeks and 3 weeks after treatment.

## Data Analysis

This study have statistically processed the data using SPSS ver 13.0, and the significance level was fixed as  $\alpha < .05$ .

First, t-test was used for periodic comparison between the common characteristics of a sample and an experiment group and control group.

Second, ANOVA was used for the comparison of measuring time between an experiment group and a control group, and if they have difference between two groups, and Scheffe test(post hoc tests) was used for the group with difference.

## RESULTS

### Characteristics of Subjects

As a result of analyzing the common characteristics of a sample, total 24 subjects - 12 subjects in an experiment group and 12 subjects in a control group, and there were 9 male subjects and 15 female subjects in two groups. The average age of an experiment group was 32.08 years old and one of a control group was 30.58 years old. The average height of an experimental group was 168.01cm and one of a control group was 167.35cm. The average weight of an experiment group was 61.14kg and one of a control group was 61.75kg.

Table 1. Characteristics of subjects

	Study group (n=12)	Control group (n=12)	Total (n=24)	t	p
Age(yr)	32.1 $\pm$ 4.4	30.6 $\pm$ 4.2	31.3 $\pm$ 4.3	.858	.400
Height(cm)	168.0 $\pm$ 7.2	167.4 $\pm$ 6.9	167.7 $\pm$ 6.9	.229	.821
Weight(kg)	61.1 $\pm$ 10.8	61.8 $\pm$ 13.2	61.4 $\pm$ 11.8	-.124	.903

### Comparison for Blood Flow Rates in an Internal Carotid Artery between Two Groups by a Measuring Period

As a result of comparing an internal carotid artery for each period between an experiment group and a

control group, there was no significant difference that the internal carotid artery of an experiment group for the first time was  $20.25 \pm 2.00$  and the one of a control group was  $20.62 \pm 3.19$ . Even after 1 week, there was no meaningful difference that one of an experiment group was  $21.04 \pm 2.34$  and one of a control group was  $20.37 \pm 2.75$ , too. After 2 weeks, however, there was significant difference that one of an experiment group was  $23.54 \pm 2.22$  and a control group was  $20.50 \pm 3.44$  ( $p < .05$ ). As well, the results after 3 weeks showed meaningful difference that one of an experiment group was  $25.58 \pm 2.27$  and one of a control group was  $21.45 \pm 2.63$  ( $p < .001$ ).

**Table 2.** Comparison for blood flow rates in an Internal carotid artery between two groups by a measuring period (cm/s)

	Group	N	Mean±SD	t	p
Initial	study	12	20.25±2.00	-.345	.734
	control	12	20.62±3.19		
1week	study	12	21.04±2.34	.638	.530
	control	12	20.37±2.75		
2week	study	12	23.54±2.22	2.571	.017*
	control	12	20.50±3.44		
3week	study	12	25.58±2.27	4.107	.000**
	control	12	21.45±2.63		

\* :  $p < .05$  \*\* :  $p < .001$

### Comparison for VAS between two Groups by a Measuring Period

As a result of comparing VAS for each period between an experiment group and a control group, there was no significant difference that VAS of an experiment group for the first time was  $6.17 \pm 1.35$  and a control group was  $6.26 \pm 1.20$ .

In the VAS after 1 week, there was no meaningful difference that one of an experiment group was  $4.75 \pm 1.51$  and one of a control group was  $4.89 \pm .92$ . Also, there was no significant difference even in the VAS after 2 weeks that one of an experiment group was  $3.80 \pm 1.28$  and one of a control group  $4.28 \pm 1.50$ . In the VAS after 3 weeks, however, there was significant difference that one of an experiment group was  $1.57 \pm 1.08$  and one of a control group was  $2.59 \pm 1.20$  ( $p < .05$ ).

**Table 3.** Comparison for VAS between two groups by a measuring period (cm/s)

	Group	N	Mean±SD	t	p
Initial	study	12	6.17±1.35	-.175	.863
	control	12	6.26±1.20		
1week	study	12	4.75±1.51	-.276	.785
	control	12	4.89±0.92		
2week	study	12	3.80±1.28	-.832	.414
	control	12	4.28±1.50		
3week	study	12	1.57±1.08	-2.168	.041*
	control	12	2.59±1.20		

\* :  $p < .05$

### Comparison for Blood Flow Rates in an Internal Carotid Artery of an Experiment Group by a Measuring Time

As a result of comparing the internal carotid artery of an experiment group by a measuring time, it showed a significant increase ( $p < .001$ ). Accordingly, the results of a Scheffe test for an internal carotid artery are as followings.

**Table 4.** Comparison for blood flow rates in an Internal carotid artery of an experiment group by a measuring time

		Sum of squares	df	Mean square	F	p
ICA	Between groups	212,854	3	70,951	14,445	.000**
	Within groups	216,125	44	4,912		

\*\* :  $p < .001$

**Table 5.** Post analysis for blood flow rates in an Internal carotid artery of an experiment group

	Week (I)	Week (J)	Mean diff. (I-J)	Stand. error	p
ICA	Initial	1week	-.79	.90	.857
		2week	-3.29	.90	.008*
		3week	-5.33	.90	.000**
	1week	2week	-2.50	.90	.068
		3week	-4.54	.90	.000**
		2week	3week	-2.04	.90

\* :  $p < .05$  \*\* :  $p < .001$



**Comparison for VAS of an Experiment Group by a Measuring Time**

As a result of comparing VAS of an experimental group by a measuring time, it showed a significant decrease ( $p < .001$ ). Accordingly, the results of a Scheffe test for VAS of an experiment group by a measuring time are as followings.

**Table 6.** Comparison for VAS of an experiment group by a measuring time

		Sum of squares	df	Mean square	F	p
VAS	Between groups	134.241	3	44.747	25.635	.000**
	Within groups	76.804	44	1.746		

\*\* :  $p < .001$

**Table 7.** Post analysis for VAS of an experiment group

		Week (I)	Week (J)	Mean diff. (I-J)	Stand. error	p
VAS	Initial	1week		1.42	.53	.088
		2week		2.36	.53	.001*
		3week		4.60	.53	.000**
	1week	2week		.94	.53	.395
		3week		3.17	.53	.000**
		2week	3week		2.23	.53

\* :  $p < .05$  \*\* :  $p < .001$

**Comparison for Blood Flow Rates in an Internal Carotid Artery of a Control Group by a Measuring Time**

As a result of comparing an internal carotid artery of a control group by a measuring time, there was no significant increase ( $p > .05$ ).

**Table 8.** Comparison for blood flow rates in an internal carotid artery of a control group by a measuring time

		Sum of squares	df	Mean square	F	p
ICA	Between groups	8.641	3	2.880	.315	.814
	Within groups	402.354	44	9.144		
	Total	410.995	47			

**Comparison for VAS of a Control Group by a Measuring Time**

As result of comparing VAS of a control group by a measuring time, it showed significant decrease ( $p < .001$ ). Accordingly, the results of a Scheffe test for VAS of a control group by a measuring time are as followings.

**Table 9.** Comparison for VAS of a control group by a measuring time

		Sum of squares	df	Mean square	F	p
VAS	Between groups	83.555	3	27.852	18.483	.000**
	Within groups	66.302	44	1.507		
Total		149.857	47			

\*\* :  $p < .001$

**Table 10.** Post analysis for VAS of a control group

		Week (I)	Week (J)	Mean diff. (I-J)	Stand. error	p
VAS	Initial	1week		1.37	.501	.071
		2week		1.98	.501	.004*
		3week		3.67	.501	.000**
	1week	2week		.60	.501	.690
		3week		2.30	.501	.001*
		2week	3week		1.69	.501

\* :  $p < .05$  \*\* :  $p < .001$

As a result of post analysis, there were significant difference between one of the first time and after 2 weeks, one of the first time and 3 weeks after treatment, 1 week and 3 weeks after treatment and 2 weeks and 3 weeks after treatment.

**DISCUSSION**

The term of 'a tension type headache' was clearly defined by IHS in 1988, and it is classified into an episodic headache and a chronic headache in accordance with headache days. Such an episodic and chronic headaches are subdivided by muscular tenderness of a head and neck or normality or abnormality of EMG(electromyogram). Still, there have been controversy about the pathogenesis of a tension type headache, but most researchers have thought

that muscular contraction and mental factors affect each other because it is caused by stress, depression, anxiety and so on.

The pain intensity of a tension type headache is more slight than a migraine headache. But it is one of the most common headaches and has clinically important meaning because a serious mental disease like depression, etc. can be inherent in the patient with a chronic tension type headache(17).

TCD is indirectly able to surmise the lesion of a blood vessel by measuring a blood flow rate under the principle that a blood flow rate is in inverse proportion to a vessel diameter and is a measuring instrument to be useful for judging the change of cerebrovascular without use of contract media and pain(18, 19).

Lee and Han insisted that it is possible to assume a blood flow rate increases if a vessel becomes narrow due to a lesion of a cerebral tissue, and on the contrary, the rate decreases in a normal state or after therapeutic intervention(20). And they suggested the results of Lee and Kim as the data to support their opinion(21).

Also, Wallasch reported that CBF rate of a headache patient is faster than one of a normal person because CBF rate of a chronic tension type headache patient is 64cm/sec and one of an episodic headache patient is 76cm/sec. As well, the results of Lee and Han reported that CBF rate got decrease as the experiment progresses compared with the value before an experiment(20).

Unlike above results, however, Park et al. reported that CBF rate of a tension type headache patient increased as a result of comparing CBF rate before and after electrotherapy for 2 weeks and CBF of patient group who had treated more than 6 times for 2 weeks increased more than before a treatment as a result of investigating whether the number of treatment affects the change of CBF of a tension type headache patient or not(22).

Lee et al. reported that there were significant changes in a middle cerebral artery, an anterior cerebral artery and a posterior cerebral artery as a result of measuring and comparing CBF rate of headache patients using TCD after applying acupuncture to Tai-Yang(Ki-blood), Poong-Ji(GB20) and Du-Yu(ST8) for 2 weeks(23).

According to the research of Kang et al., the main treatment points are about 101 acupoints and the main treatment points have been used in the order of Baik-Hoi(GV20), Hap-Gok(LI4), Poong-Ji(GB20), Du-Yu(ST8), Pung Bu(GV16), Tai-Yang(Ki-blood), Sang-Seong(GV23)(13), and in the study of Park et

al., Hap-Gok(LI4) and Yeol-Gyeol(LU7) are the basic acupoints of a common headache(14). Domestic and overseas researches have reported that an acupoint treatment is very effective for a headache(7, 24).

Han et al. reported the change of CBF after applying relaxation of myofascia and an ultrasound therapy. If relaxation of myofascia and an ultrasound therapy applied respectively, according to his study, CBF of a middle cerebral artery, a posterior cerebral artery and a vertebral artery for both right and left vessels showed significant increase and also, such CBF was increased by the number of a treatment(25).

This study also got the numerical results that CBF rate of a headache patient was increased and pain was relieved after a treatment than before. There is a problem that we should consider here. Physically, if the cross-sectional area of a vessel gets narrow, the blood flow rate gets fast. By the way, the results of this study were that the vascular cross-sectional area widens because the pressed vessel was relaxed after a treatment but instead, a blood flow rate increased. How could this study explain such situations?

Cho et al. said that a blood flow rate of a vessel is affected by a vessel diameter, blood flow, blood viscosity and so on(26). Also, the study of Kim et al. reported that a blood flow rate is affected by several factors, but primarily, it reflects the decrease of CBF(27). In addition, it has been known that the change of a blood flow rate measured by TCD is directly proportional to the change of blood flow(28). Such previous studies can explain the results of this study. That is, if a cross-sectional area of a vessel widens, blood flow increases and finally, a blood flow rate increases, too. But, it is unreasonable to conclude that the increase of CBF rate certainly causes the relief of a headache. The correlation between before and after an experiment and a cross-sectional area of a vessel and between a blood flow rate and a headache have to be studied further more later.

In this study, the difference of a time more than minimum 2 weeks needed to show significantly the increase of a blood flow rate in an internal carotid artery( $p < .05$ ). What the increase of a blood flow rate is related with the cross-sectional area of a vessel in an internal carotid artery and how a blood flow rate of another cerebrovascular is changed have to be examined and researched further.

The acupoint stimulus of SSP therapy was to study the CBF rate and pain intensity of headache patients. The more the number of a treatment, the more increased CBF rate and the more decreased pain intensity. Accordingly, it is determined that constant SSP therapy applied to acupoints greatly

affects headache patients.

But, it needs to prepare for the clear statistical evidences for more patients because this study excluded the psychological effects of CBF rate.

## CONCLUSION

This study had measured and compared CBF rate of an internal carotid artery and pain intensity under the difference of a time such as before treatment, 1 week, 2 weeks and 3 weeks after applying SSP therapy to 24 headache patients - 12 tension type headache patients(study group) and 12 non tension type headache patients(control group) in order to the effect that SSP therapy applied to acupoints affects the change of a CBF rate and pain relief for tension type headache patients and non-tension type headache patients, and the results were as followings.

1. For the CBF rates of study group and a control group, there was significant difference in an internal carotid artery of study group 2 weeks after treatment( $p < .05$ ).

2. As a result of comparing VAS of study group by a measuring period, the group had significant increase of VAS in an internal carotid artery before SSP stimulus~2 weeks after, before SSP stimulus~3 weeks after and 1 week~3 weeks after and showed meaningful pain relief before SSP stimulus~2 weeks after, before SSP stimulus~3 weeks after and 1 week~3 weeks after( $p < .05$ ) for pain scale.

3. As a result of comparing VAS of a control group by a measuring period, the group had no significant difference for the increase of blood flow in an internal carotid artery and showed significant pain relief before SSP stimulus~2 weeks after, before SSP stimulus~3 weeks after, 1 week~3 weeks after and 2 weeks~3 weeks after for pain scale( $p < .05$ ).

According to above results, it is judged that SSP therapy applied to an acupoint is able to affect the change of blood flow rate in an internal carotid artery and pain relief.

Therefore, this study suggests that SSP therapy to acupoints using TCD will be helpful for pain relief of a headache patient through clinical research how it affects CBF rate and pain relief.

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