

## Acupuncture and Moxibustion Treatment for Tinnitus

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According to the 2013 Comprehensive Survey of Living Conditions, there were 26 males and 34 females per one thousand population with tinnitus, an increase from the 2010 survey. Tinnitus increases dramatically with age. The prevalence rate of tinnitus among the elderly was 67 males and 66 females per one thousand people.

Tinnitus is often subjective and the cause is often unknown. Tinnitus is the sensation of sound in the absence of any apparent sound source other than inside the body. Tinnitus is clearly distinguished from auditory hallucinations in which the content of the sound heard has meaning, such as words or music. Tinnitus is the sensation of sound without meaning [1]. Tinnitus may be accompanied by the sound of muscular contractions or vascular noise [2].

The mechanism by which tinnitus occurs is explained to be that when the brain perceives a lack of sound signals, the brain increases its activity in an attempt to compensate for the missing portion [3]. Stress is also said to ravage cerebral function and affect the cochlea. Tinnitus can be classified into subjective tinnitus and objective tinnitus. Subjective tin-

nitus is heard only by the patient and accounts for the majority of tinnitus. Objective tinnitus is a sound that can be heard by others, too. The cause of subjective tinnitus is often unknown, but it is thought to be due to a lesion in the inner ear or cochlear nerve. High-pitched tinnitus is suspected to be a sensorineural disorder due to inner ear or central nervous system disease. Low-pitched tinnitus is suspected to be a conductive disorder such as middle ear disease [4]. Because of the wide variety of diseases that cause tinnitus, fundamental treatment of tinnitus is difficult. Antianxiety medications etc. may be prescribed, and psychotherapy may be carried out.

Tinnitus can be classified into two types, otic tinnitus and somatic tinnitus. Tinnitus is associated with disorders of the inner ear or cochlear nerve. There are several pathways by which ear or nerve damage can be associated with tinnitus. Somatic tinnitus is generated resulting from that the somatosensory system affects the auditory system by the interaction between the somatosensory system and the central nervous system which includes the auditory system [5,6,7]. Somatic tinnitus is a non-auditory tinnitus.

The treatment of tinnitus in modern medicine involves surgery on the cochlear nerve. Electrical stimulation can be effective in suppressing the cochlear nerve. Acupuncture and moxibustion has the potential to suppress tinnitus by activating pathways to the somatic nerve nuclei in the medulla oblongata. The influence of somatosensory stimulation is also important because subjective tinnitus is influenced by the emotional and autonomic nervous systems [8]. Objective assessment of tinnitus is difficult because tinnitus is subjective. Evaluation methods include the Standard Tinnitus Test Method 1993, the Tinnitus Visual Analog Scale (VAS), and the Tinnitus Handicap Inventory (THI). The methods can quantify the degree of improvement of tinnitus.

In Oriental medicine, tinnitus is broadly classified into Liver and Gall bladder heat and Kidney essence deficiency. There is also tinnitus caused by phlegm-dampness and weakness of the spleen and stomach [9]. Tinnitus can be classified into exterior pattern, interior pattern, and intermediate pattern [10]. The Yellow Emperor's Classic of Internal Medicine also describes tinnitus. Since then, it has been variously identified and effective acupuncture points have been indicated. Recently, anxiety, depression, insomnia, and irritability are said to adversely affect the limbic system, which in turn affects the autonomic nervous system via the cochlear nerve. Since hearing is located in the temporal lobe of the cerebrum, it can be treated with head acupuncture, which was progressed as scalp acupuncture in 1984. In eight trigrams scalp acupuncture on TE20, eight points are used, centering on the upper two inches of TE20 and up

and down, left and right, and slant directions [11].

In acupuncture treatment of tinnitus, tinnitus reaction points are used where tinnitus improves with pressure[12]. Tinnitus was reduced or eliminated even in reports of the automatic movements of the facial and neck area as well as the pressure or electro-acupuncture stimulation on the acupuncture points [13]. In a report of the pressure stimulation of acupuncture points in the neck and hand, acupuncture stimulation at the site of the tinnitus changed by the pressure stimulation also reduced tinnitus [14]. At the tinnitus reaction point, tinnitus was reduced not only by retaining needle but also by weak acupuncture stimulation with press needle or noninvasive acupuncture instruments. Tinnitus reaction points are not only located in the head and neck area around the ear, but also in the upper and lower extremities, so careful exploration is necessary. In a report of the vertigo and tinnitus outpatient for acupuncture and moxibustion, tinnitus VAS decreased [15]. Tinnitus and dysacusis often coexisted [16,17]. In the clinical treatment of tinnitus, not only the tinnitus reaction point, but also a multiple treatments are used such as pattern identification and treatment, acupuncture point location determination based on meridian, exacerbating factors, and accompanying symptoms.

Acupuncture and moxibustion treatment not only reduces tinnitus, but also has beneficial effects throughout the whole body. Whole body effects include improved visual acuity, reduction of eye strain, improvement of ocular circulation, lowering of intraocular pressure, relax-

ation of ciliary muscle tone, adjustment of autonomic nervous system functions, and relaxation of the mind and body. Other effects include analgesia, improvement of blood flow in organs and nerves, relaxation of muscle tone, improvement and promotion of intestinal peristalsis, immune regulation, and anti-inflammatory and anti-allergic effects. The mechanism of tinnitus reduction is subject to the interaction and mutual influence of various parts of the human body, such as the relationship between hearing and the whole body. Therefore, the whole body effects by acupuncture and moxibustion treatment influence the reduction of tinnitus. Thus, there is not only a direct effect on tinnitus, but also an indirect effect due to whole body effects. The effects in the whole body by acupuncture and moxibustion treatment, such as autonomic nerve regulation and relaxation, are also important. There are individual differences in the manifestation of effects. Therefore, it is necessary to consider the reduction of tinnitus as the culmination of various acupuncture and moxibustion effects.

In discussion, the effect of acupuncture and moxibustion treatment for tinnitus is examined. Tinnitus signals pass through the cochlear nerve to the cerebral cortex. Mental stress can affect the autonomic nervous system and worsen tinnitus [3]. There, excessive feelings of anxiety, anger, or depression worsen tinnitus. Since acupuncture and moxibustion treatment has the effects of autonomic nerve regulation and relaxation, acupuncture and moxibustion treatment for tinnitus is expected to be effective. There are also modern medicine approaches to tinnitus retraining therapy and reducing irri-

tability [8]. The improvement of tinnitus with acupuncture and moxibustion treatment may be due to such an indirect effect on the stagnation of liver qi. The purpose of acupuncture and moxibustion treatment for tinnitus is to reduce the magnitude of tinnitus after the treatment compared to before the treatment. Because tinnitus rarely disappears completely, the ultimate goal of treatment is to make the patient not worry about ringing. Not only the disappearance of tinnitus but also realizing the patient who doesn't worry about ringing is an important effect. To clarify the effect of acupuncture and moxibustion treatment on tinnitus, it is necessary to ask the patient whether tinnitus bothers him or her. If the tinnitus does not bother them, it is the same as if there is no tinnitus. In acupuncture and moxibustion treatment, it is necessary to evaluate the presence or absence of treatment effect on tinnitus by asking whether the number of times in which tinnitus bothers the patient on a daily basis has decreased. In acupuncture and moxibustion treatment for tinnitus, it should be noted that there are individual differences in the onset of the suppression effect of tinnitus. Tinnitus may be affected by diseases other than the patient's complaint. Patients who has earnest wish to their tinnitus may have excessive expectations. It is also important to inform such kind of patients that they may not feel the effect of tinnitus reduction even after receiving acupuncture and moxibustion treatment.

Tinnitus was reduced even with non-penetrating acupuncture needles such as press needles or with very slight stimulation. Therefore, it is important to investi-

gate the reduction of tinnitus using press needles with various stimulation intensities. Although weekly treatment is sufficient for tinnitus treatment, it is also important to establish self-care treatment through pedestal moxa and auricular acupuncture, since self-care is necessary for those who cannot come once a week. It is also important to examine the effectiveness of treatment for tinnitus with dysacusis. The acupuncture and moxibustion treatment is expected to reduce tinnitus even in the presence of dysacusis. There are cases in which dysacusis is improved by acupuncture and moxibustion treatment. However in general, the treatment of dysacusis is difficult. The results of hearing tests as a function of the cerebrum may have little relationship to the ease of hearing. Even if the hearing test does not show any change, the patient may be able to hear better. The judgment of the effect of acupuncture treatment should include not only the result of the hearing test but also the ease of listening. Examination of the mechanism of tinnitus reduction on acupuncture and moxibustion treatment is also necessary. Since there are direct, indirect, and interactive effects, it is necessary to consider their combined effects and long-term effects. It is important not only to elucidate the mechanism of individual effect, but also to gain knowledge of the mechanism of the effect expected for long-term. Tinnitus is thought to be a situation in which the brain is hypersensitive and picks up signals that would normally be excluded. Acupuncture and moxibustion treatment is thought to suppress tinnitus as a result of inhibition of the somatosensory center. Under normal situation, the inhibitory effect on the so-

matosensory center disappears when acupuncture stimulation ceases. However, reduction of tinnitus sometimes continue over the long term even after acupuncture treatment is discontinued. This is probably because the patient was released from the stress of despair of tinnitus. Since the presence of tinnitus is a major stress, the experience that tinnitus can be reduced, even if only slightly, free the patient from despair. It is considered that the stress-induced tinnitus was suppressed by the acupuncture and moxibustion treatment. Therefore, reducing tinnitus, even if only slightly, will have a positive feedback on the patient's stress relief and lead to a long-term reduction of tinnitus.

Tinnitus can be viewed as a disease sensor output rather than a disease. Tinnitus often becomes louder when fatigue builds up or the patient's physical condition takes a turn for the worse. This can be thought of as the tinnitus sounding a siren that signals that one's physical condition is deteriorating. Changes in the intensity of the tinnitus can be used to determine whether the patient is in good or bad physical condition. Therefore, patients should not think of tinnitus as a disease and focus on eliminating tinnitus, but rather would be better to consider to use the tinnitus to ascertain their physical condition. Patients should be taught to allow and utilize tinnitus as a valuable sensor of their physical condition. In this way, negative feelings will disappear and tinnitus will not bother them, even if they have tinnitus. Thus, when a state in which tinnitus does not bother them is realized, the tinnitus is positioned as if it were not present. It is important to educate pa-

tients to view tinnitus in a positive manner.

In summary, tinnitus is often subjective and the cause is often unknown. Because of the wide variety of diseases that cause tinnitus, fundamental treatment of tinnitus is difficult. Antianxiety medications etc. may be prescribed, and psychotherapy may be carried out. In Oriental medicine, tinnitus is broadly classified into Liver and Gall bladder heat and Kidney essence deficiency. There is also tinnitus caused by phlegm-dampness and weakness of the spleen and stomach. In acupuncture treatment of tinnitus, tinnitus reaction points are used where tinnitus improves with pressure. At the tinnitus reaction point, tinnitus was reduced not only by retaining needle but also by weak acupuncture stimulation with press needle or noninvasive acupuncture instruments. Tinnitus reaction points are not only located in the head and neck area around the ear, but also in the upper and lower extremities, so careful exploration is necessary. In the clinical treatment of tinnitus, not only the tinnitus reaction point, but also a multiple treatments are used such as pattern identification and treatment, acupuncture point location determination based on meridian, exacerbating factors, and accompanying symptoms. The mechanism of tinnitus reduction is subject to the interaction and mutual influence of various parts of the human body, such as the relationship between hearing and the whole body. Therefore, the whole body effects by acupuncture and moxibustion treatment influence the reduction of tinnitus. The effects in the whole body by acupuncture and moxibustion treatment, such as auto-

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