

## Intervention Strategies Of Music Therapy For Thyroid Disorders

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### Abstract

Music therapy is a specific psychotherapeutic approach aimed at treating patients using elements, types, forms and activities of music. Music therapy has been studied, educated and practiced clinically in China from primitive and feudal societies to contemporary times. The pentatonic therapy is a unique Chinese music therapy, which is mentioned in the comprehensive medical book *Huangdi Neijing (The Yellow Emperor's Classic of Internal Medicine)*, which was created during the pre-Qin and Han dynasties: it corresponds to the five tones, five elements, five aspirations and the five viscera. China's contemporary music therapy began in the late 1980s, and its interventions for illness and optimisation of life have shown increasing benefits and acceptance by different patients.

In 2022, the Chinese Centre for Disease Control and Prevention announced a total prevalence of thyroid-related diseases of up to 20% in China. Thyroid patients are susceptible to emotional problems and even psychological disorders after illness due to a variety of factors such as age, gender, and family genetics. Due to the versatility and complexity of thyroid disorders, emotional disturbances triggered by medications or the condition can be helped to alleviate some of the patient's psychological torment through the painless intervention of music therapy. Music therapy also plays an active role in oncology, cardiology, nephrology, cardiothoracic surgery, psychiatric rehabilitation and clinical psychology to help patients alleviate negative psychology such as depression and anxiety. This article attempts to analyse the role of music therapy as a positive intervention in thyroid disorders from a music therapy perspective. The article describes the possibility and necessity of combining music therapy with medication in the treatment of thyroid disorders, in the hope that it will provide help in alleviating the psychological disorders and suffering of thyroid patients.

**Keywords:** Music Therapy, Thyroid Disorders, Pentatonic Therapy, Intervention Strategies

### Background And Significance Of The Study

Music therapy is a method of using music or sound as a non-verbal communication tool to intervene at an educational, rehabilitative or therapeutic level. In 1996 the World Federation of Music Therapy defined it as music therapy is the use of music and/or elements of music

(sound, rhythm, melody and harmony) by a qualified therapist with a user or group to nurture and facilitate communication, relationships, learning, movement, expression, organisation and other related therapeutic purposes in order to meet physical, emotional, social and cognitive needs. The aim of music therapy is to develop the individual's latent abilities to better achieve internal harmony and interpersonal integration, and to improve the quality of life through a process of prevention, rehabilitation and treatment. At the 13th World Congress in Seoul in 2011, the definition of music therapy was changed to music therapy is the use of specialised music and musical elements in interventions with individuals, groups, families or communities in medical, educational and social settings. The aim is to optimise quality of life and to improve and enhance physical, social, communication, emotional, intellectual and spiritual well-being. Research, practice, education and clinical training in music therapy are based on professional guidelines in cultural, social and political contexts.

Music therapy in China points to witch doctors in primitive societies, and pentatonic therapy is recorded in *the Yellow Emperor's Classic of Internal Medicine*, the earliest surviving medical text. It began to be used in clinical practice during the Tang and Song dynasties and was further developed during the Ming and Qing dynasties. Ancient books such as the *Yueji*, the *Yuelun*, and the *Lüshi Chunqiu*, record the effects of music on people. Contemporary music therapy in China began in the late 1980s, with the establishment of the Chinese Society of Music Therapy in 1989, which led to the gradual application of the therapy.

In ancient Western cultures it was believed that music was related to medicine, that states of illness were associated with the presence of evil spirits, and that evil must be exorcised from the patient's body and spirit. Medical priests (shamans) believe that the principles of music constitute the world, and that the universe and human life are governed by rhythm and harmony. The shaman uses songs and rhythmic melodies, often accompanied by the sound of a hollow pumpkin or drum being struck. It was initially believed that music had an awakening power over the irrational part of human beings and could bring happiness to them, even in a state of sickness. In Greek culture, music was associated with philosophy. Greek culture considered music to be central to social and religious life. The Greeks believed that music was medicine for the soul. Ancient Greek philosophers have studied music therapy, for example, Plato believed that some melodies stimulate certain emotions and relax people, some melodies are mournful, some have a positive educational function while others cannot be used in the education of young people; Aristotle has furthered his understanding of music therapy, he believed that the art of rhythm is conducive to one's inner peace and that the art of sound liberates mental tensions, and he believed that all types of music are meaningful; Pythagoras defined some of the ideas of music therapy, he believed that music must be adapted to the personality of the person, that the person needs to adapt slowly to unfamiliar music, that music can change the deep psychological state of the person, to be more self-accepting, to realise one's own abilities and potentials, and that music can alleviate physical and mental tensions in daily life. In 1749, Richard Brocklesby, an English physician and musician, published the world's first treatise on music therapy *Reflections on Antient and Modern Music with the Application to the Care of Disease*, he compares old and new music techniques and gathers evidence to support the use of music therapy for mania and mental disorders.

Music therapy as a complement to other therapeutic methods and is most used to treat drug addiction, eating disorders, anxiety, depression and mental disorders. In the April 2007 1st edition of *Grounded Theory in Music Therapy*, it is mentioned that according to the American Music Therapy Association (AMTA) in 2005, nearly 5,000 Nationally Registered

Music Therapists in the United States were working in 30 different areas such as AIDS, brain injuries, learning disabilities, psychiatric disorders, Parkinson's/Alzheimer's Disease, Post-Traumatic Stress Syndrome, stage nervousness in musicians, and psychotherapy for normal adults.

A case study of music therapy in the operating theatre of the Bolzano Hospital in Italy shows: a 73-year-old patient was very agitated, confused and physically aggressive, but the nurses had to perform a complex surgical wound dressing on his lower limb, and the patient was uncooperative, verbally abusive and pulling at the nurses. At this point, the patient is at risk of COPD-induced carbon toxicity. Two hours later, the nurses tried again and the bandaging still failed. A nurse asked for help from the doctor on duty, who sang Schubert's *Ave Maria*. After singing a few notes, the patient stopped screaming, sang along, and showed no resistance or aggression to receiving medication. The song lasted for about ten minutes, and the patient gradually relaxed while humming, his heart rate reduced from 105 to 83 beats per minute, and his RASS score<sup>1</sup> dropped from 3 to 0, which was conducive to a smooth bandaging process. In this case, singing as an intervention and music as a complement to medical interventions worked well to combat anxiety, stress and distraction.

As of 2020, the prevalence of all types of thyroid diseases in China will be 50.96 per cent, and the prevalence of thyroid function abnormalities will be 15.22 per cent, according to the Ultrasound Society of the Chinese Medical Association and other reports. Between 2005 and 2015, the overall thyroid cancer incidence rate increased by an average of 12.4 per cent per year and the thyroid cancer mortality rate increased by an average of 2.9 per cent per year. The prevalence of thyroid nodules detected by ultrasound is about 20-35 per cent, and the incidence of thyroid cancer in China is three times higher in women than in men. Patients who suffer from hyperthyroidism or hypothyroidism may suffer from anxiety and depression. Thyroid hormones play an important role in regulating neurological and psychological aspects, and dysfunction of the gland can lead to anxiety, depression and other altered emotional states. Research suggests that the link between thyroid dysfunction and affective disorders may be determined by the dysregulation of TSH circadian rhythms and the involvement of TRH in mood regulation. About 60 per cent of patients with hyperthyroidism suffer from anxiety and between 39 and 61 per cent suffer from depression. Depression is one of the common conditions in hypothyroidism, with 40 per cent of patients suffering from depression. According to a study published in December 2011 by Mirella P. Hage and Sami T. Azar titled *The Link between Thyroid Function and Depression*, approximately 1% to 4% of patients with mood disorders suffer from hypothyroidism, with 4% to 40% suffering from subclinical hypothyroidism. The American Association of Clinical Endocrinologists and the American Thyroid Association recommend that a diagnosis of subclinical or overt hypothyroidism should be considered in all patients with depression. As the largest endocrine gland in the human body, the main function of the thyroid gland is to synthesise thyroid hormones and regulate the body's metabolism. In 1825, internist C.H. Parry hypothesised and described the relationship between thyroid dysfunction and what we now call mood disorders. Both excess and insufficient thyroid hormones can lead to abnormal moods, and

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<sup>1</sup> RASS scores: Richmond Agitation-Sedation Scale (RASS) scores were recorded for 24 h and 72 h after withdrawal, -1: not fully awake but can remain awake for >10 s; 0: calm and awake; 1: agitated and anxious but with only slight body movements; 2: agitated and anxious with intense body movements; 3: very agitated and attempts to remove gastric tubes or intravenous access; 4: aggressive behaviour...

when talking about thyroid abnormalities associated with depression, people specifically mention high or low levels of the hormones T3 and T4, which are essential for the development and growth of many tissues, as well as a weakened response of TSH to the thyrotropin-releasing hormone TRH. Thyroid hormone supplementation appears to accelerate and improve the clinical response to antidepressant medication, further confirming the thyroid-mood link. Symptoms of depression may vary in patients with hypothyroidism and/or hyperthyroidism, with hyperthyroid patients experiencing symptoms of unusual nervousness, fidgetiness, anxiety and irritability, and hypothyroid patients experiencing fatigue, depression.

This article proposes the hypothesis that music therapy may become an adjunctive treatment for the treatment of thyroid disorders, which is the author's purpose in writing this article. Music helps to relieve stress, which is one of the triggers of thyroid disease. Stress causes the body to produce excess cortisol, which affects the production and conversion of thyroid hormones. Music regulates the body's cortisol levels, providing comfort and calmness and improving thyroid function. In Akshaya V. Saklecha et al, *Effect Of Aerobic Exercises Along With Music Therapy On The Fatigue And Quality Of Life In Female With Thyroidectomy Following Thyroid Cancer: A Research Protocol*, it was mentioned that thyroid cancer is the most common endocrine cancer in women, the sixth most common of all cancers, and that women tend to feel fatigue after thyroidectomy. The study was conducted by recruiting 30 female patients prone to fatigue and reduced quality of life from thyroidectomy, ranging in age from 22 to 55 years old, after a six-week course of aerobic exercise combined with music therapy as an intervention for fatigue levels and life therapy before and after treatment. Discussion concludes that aerobic exercise combined with music therapy is a viable method of treating postoperative thyroid cancer to improve fatigue and quality of life in women. Findings will provide important evidence that aerobic exercise combined with music therapy improves fatigue and quality of life in female patients after thyroid cancer surgery. According to Chen Zhimei et al.'s article, *Study on the Application Effect of Music Therapy in Perioperative Thyroid Tumour Patients*, they carried out music therapy interventions on some of the 102 perioperative thyroid tumour patients in Jiangmen Hospital affiliated to Sun Yat-sen University, Guangdong Province, from January 2008 to January 2009 and randomly divided them into 50 cases of the observation group and 52 cases of the control group, who appreciated the self-selected light music in the evening of the day before the operation for 30min, such as *Colourful Clouds Chasing the Moon*, *Snowdrops*, etc., of which *Colourful Clouds Chasing the Moon* is in A-gong mode in pentatonic mode. Music therapy was performed for 2h before entering the operating theatre on the day of surgery, and their favourite music was played to the patients until 24h after surgery. The results found that music therapy has a good effect on maintaining the patient's basic perioperative vital signs.

The author read books and literature on the thyroid, music therapy, and psychiatric disorders, and through methods such as historical documentation and interdisciplinary research, aspires to learn and sort out four points of knowledge: the relevance of the thyroid gland to mood, the role of music on mood, the positive interventions of music therapy on mood, and the possibility that music therapy may be an adjunct to treatments aimed at thyroid patients.

## Thyroid Disease and Pentatonic Therapy

### Mental disorders caused/induced by thyroid disease

Thyroid dysfunction is mentioned in the 2008 edition of *Psychiatry*, Chapter 5, Neurocognitive Disorders and Related Disorders, Section 2, Common Brain Disorders Associated with Neurocognitive Disorders, Part XII, Neurocognitive Disorders Associated with Endocrine Disorders. Hyperthyroidism is caused by an overproduction of thyroid hormones and is more common in women than in men, often in women in their 20s and 30s. Hypothyroidism in infancy predisposes to cretinism, mucoedema psychosis syndrome in adult hypothyroidism may be accompanied by hallucinations and delusions, hypothyroidism in old age presents with slowness of speech, unresponsiveness, etc.

### Overview of thyroid diseases

According to the Chinese higher education textbook *Internal Medicine*, published in October 2010, thyroid diseases are described in detail in chapters 8 to 12 of title VII, Diseases of the endocrine system. Thyroid diseases are classified as goiter, hyperthyroidism, hypothyroidism, thyroid nodules, thyroiditis nodules and differentiated thyroid cancer. Goiter is divided into simple goiter, also called nontoxic goiter, includes endemic goiter and sporadic goiter. For the prevention of endemic goiter, China has introduced universal salt iodization since 1996. Thyrotoxicosis is divided into hyperthyroidism and non-hyperthyroidism types. Graves' disease is the most common cause of hyperthyroidism, accounting for about 80-85 per cent of all cases of hyperthyroidism. Hypothyroidism with a prevalence rate of 2.9/1000, easy fatigue, depression, anorexia, bloating etc. Thyroiditis is classified as subacute thyroiditis, autoimmune thyroiditis and postpartum thyroiditis.

The July 2018 issue of *Internal Medicine* describes thyroid disorders in Chapters IX-XIII, the classification of the large chapters is consistent with that of the seventh edition of *Internal Medicine*. However, adjustments have been made in the division of some of the subsections, where nontoxic goiter is divided into diffuse nontoxic goiter and nontoxic multinodular goiter, thyroiditis is classified as subacute thyroiditis, autoimmune thyroiditis and painless thyroiditis. Nontoxic multinodular goiter refers to nodular enlargement of the thyroid gland without abnormal thyroid function, adult prevalence 12 per cent, common in women, the elderly, iodine-deficient areas. Painless thyroiditis can occur at any age, is more common in women than in men, and thyroid autoantibodies are present in 50 per cent of patients.

### Pentatonic Therapy

The Chinese character 乐, when pronounced yuè, usually denotes something related to music. The Chinese character 药 usually refers to something that cures a disease. The Chinese traditional characters 乐 and 药 are very similar, i.e. 樂 and 藥, 藥 is derived from the character 樂.

Cangjie made the word 樂 based on the story of the Yellow Emperor's battle with Chi You. After the Yellow Emperor defeated Chi You, Chi You's soldiers were stunned by the war drums. The Yellow Emperor healed the soldiers with a metal bell-shaped instrument, Cangjie created the character 樂 based on this instrument. It's been discovered that music heals, and so does grass. Later, a cursive character was added to 樂 to make 藥. *The Yellow Emperors Classic of Medicine*, written more than 2,200 years ago, records that music has the effect of lowering blood pressure, reducing anxiety, improving memory and stabilising the heart rate. It records the pentatonic therapy, which refer to the gong, shang, jiao, zheng, and yin (chinese

character: 宫、商、角、徵、羽). Pentatonic therapy is the use of music of different pitches to treat illnesses and is related to the body's internal organs, emotions and personality. The concept of pentatonic does not simply refer to the five tones of the scale or the five modes, rather, it refers to the traditional Chinese pentatonic modal system based on it, involves musical concepts such as pentatonic, hexameter, heptameter, dodecameter, twenty-five tones, and so on. The efficacy of the five modes is mentioned in my paper "*THE CHINESE PENTATONIC*" *From its origins to contemporary experience*, for example, the Gong melody regulates the spleen and stomach, protects the lungs and kidneys, relieves pre-game tension, regulates mental fatigue and insomnia; the Shang melody is suitable for people who overwork their brains and find it difficult to relax; the Jue melody is recommended for people with poor liver function and is used to actively intervene in menstrual irregularities, depression, and irritability; the Zhi melody helps to improve blood circulation and respiration; the Yu melody aids sleep and relieves over-excitement. In the Gong style, there are pieces such as *Silence on the Empty Mountain*, *Little Trumpet*, *Rudraksha*, *High Moon* etc; Shang modes include *Gadamerin*, *Little Hujia*<sup>2</sup>, *Moonlight Night of Spring River* etc; Jue modes include *Jiangnan Silk and Bamboo Music*, *Partridge Fly*, *Gusu Xing* etc; Zhi modes include *Jasmine Flower*, *Golden Dance* and *Step by Step* etc; Yu modes include *Looking at the South River*, *Liang Zhu*, and *The Moon Reflected In Er-quan* etc.

### **Intervention of Pentatonic Therapy in Thyroid Disease**

Pentatonic therapy is mainly used in Chinese medicine. According to Lv Peng and Li Rui's *Advances in Chinese Medicine Pentatonic therapy Research*, choosing the right music for a specific condition is key. There are three kinds of dialectic methods: visceral organs dialectic, emotional dialectic and constitution dialectic. Clinical applications are for the treatment of possible and diagnosed diseases. Treating the possible illnesses, i.e., preventing complications and sequelae and promoting post-disease and post-operative rehabilitation. The treatment of established illnesses has been used for coronary heart disease, angina pectoris, heart failure, insomnia, mild cognitive impairment, chronic obstructive pulmonary disease, functional dyspepsia and so on. For example, in the treatment of lumbar disc herniation, the combination of pentatonic therapy can improve patients' pain symptoms and anxiety and depression. During participation in the treatment of novel coronavirus pneumonia, pentatonic therapy had a statistically significant effect on emotional regulation and group rehabilitation of hospitalised, closely isolated and discharged patients in a large group inpatient setting.

For hyperthyroidism, the combination of Chinese and Western medicine can effectively reduce the adverse effects of Western medicines, alleviate clinical symptoms, reduce the recurrence rate, and can be supplemented by psychological adjustment and acupuncture treatment. According to the article *The effect of jue music therapy on patients with hyperthyroidism* by Yue-Ling Xiao et al, they randomly divided 60 patients with hyperthyroidism admitted from 1 July 2016 to 31 May 2019 into 30 cases each in the observation and control groups. The observation group underwent jue-tuned music intervention for 30 minutes before surgery, and the rate of adherence to surgery and total nursing satisfaction scores of the observation group were significantly higher than those of the control group, which led to the conclusion that jue-tuned music can alleviate negative

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<sup>2</sup> Hujia: a musical instrument of the northern peoples of ancient China, resembling a flute, it is a wind instrument with rich national colours.

emotions such as preoperative anxiety, nervousness, and agitation in hyperthyroid patients. The Department of Endocrinology of the First Affiliated Hospital of Henan University of Traditional Chinese Medicine has applied the pentatonic therapy in the treatment of toxic diffuse goiter of the liver-fire type, eighty-nine patients with this disease were selected from July 2017-July 2018 and randomly divided into 45 study group and 44 control group to participate in the treatment which lasted for 2 months. The research group added the pentatonic therapy, listening to Traditional Chinese Five Elements Music (Orthodox Modulation) for 20min, the results of the study showed that the total effective rate of the study group was higher than that of the control group, and that there was a significant advantage in regulating serum thyroid hormone levels after the adoption of pentatonic therapy.

### **Summary**

Music activates certain areas of the brain involved in movement, planning, concentration, learning and memory, releasing a chemical in the brain called dopamine. Dopamine transmits happiness, joy and motivation, improves mood and reduces anxiety. Classical and meditative music can ease fatigue and reduce pain and stress, rhythmic music improves concentration, boosts motivation and changes moods. Adverse cognitive and psychological loads may induce anxiety or depression leading to endocrine disorders, thyroid hormone abnormalities mood abnormalities that may make brain function impaired. Changes in the hypothalamus and cerebral cortex in response to stress and stress can indirectly or directly weaken the immune system, leading to changes in thyroid hormone levels and subsequent morphological and structural abnormalities of the thyroid gland. Music regulates human brain function and creates coherence or excitement in the organism. Pentatonic therapy can relieve stress, improve depression, irritability and other bad moods, and may be used as one of the complementary therapies in addition to medical treatments to help thyroid patients to regulate qi and blood, relieve boredom, promote physical and mental health of patients, and reduce recurrence. Music therapy, in addition to its use in the treatment of thyroid disorders, has been progressively applied to the treatment of insomnia, coronary atherosclerotic heart disease, dementia, irritable bowel syndrome and ulcerative colitis. In the future it will gradually increase the number of clinical application cases, research cases and treatment cases, enhance its in-depth research, improve the credibility and validity of the results, and relieve patients from the pain of the disease will certainly play a positive therapeutic role.

This paper provides scholars in thyroid research and/or music therapy research with new ideas to try to apply music therapy to the study of thyroid disorders to help patients reduce mental distress and somatic disorders. The patients here are not only those who need surgery, but also those with common thyroid disorders. Thyroid disorders are common in modern times and should be popularised, publicised and given attention. Fewer studies have been reported in this area, so there is a great need for in-depth experimental evidence. The authors will continue to focus on research related to the positive intervention of music in thyroid disorders. A series of experiments will be conducted by collecting voluntary respondents to form a research group and a control group; playing different types of music to find out which type of music has better therapeutic effects in relieving thyroid disease; and by specifically categorising the relationship between thyroid disease and music. This will be an important ongoing concern for the authors in the future, and hopefully will provide useful relief for patients.

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