

Observation on the Application Effect of Background Music in the Treatment of Oral Diseases

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Abstract

Objective: The purpose of this study is to explore the clinical effect of background music in the treatment of oral diseases. **Methods:** A total of 100 patients from our department who met the research criteria were selected to participate in this study. After being evenly grouped, the patients were given a background music intervention (study group) and conventional treatment (reference group). The intervention effects of the two groups of patients were observed, and the differences between the groups were compared. **Results:** There were significant differences in the clinical research data of the study group compared with the reference group, and it had certain advantages ($P < 0.05$). **Conclusion:** The application of background music during the treatment in the department of stomatology has a significant effect. It can improve the treatment compliance of patients, reduce their pain, relieve negative emotions such as anxiety, and enhance patient satisfaction.

Keywords

Oral diseases; Background music; Treatment compliance; Pain

The Department of Stomatology is one of the key departments in the hospital. Dental caries, pulpitis, periodontitis, and other dental diseases are very common in clinical practice. These diseases not only cause pain and discomfort to patients, but also have an impact on their oral function and appearance, and the mental health of patients will also fluctuate to a certain extent [1]. During the treatment process in the department of stomatology, due to the particularity of treatment operations such as the noise of drills and the stimulation of instruments, patients often experience negative emotions such as tension, anxiety, and fear. These emotions can lead to a decrease in the pain threshold of patients, increase the difficulty and risk of treatment, and also affect treatment compliance, thereby reducing the treatment effect and satisfaction of patients [2]. Therefore, how to alleviate patients' negative emotions during dental treatment and improve their comfort and cooperation is an important issue that dentists pay attention to. Background music, as a non-pharmaceutical intervention method, has gradually attracted attention in the medical field in recent years. Psychological research shows that music can stimulate the limbic system and reticular structure of the brain through the auditory system, regulate neuroendocrine functions, and influence people's emotions and psychological states. Soothing music can lower the levels of stress hormones such as adrenaline and cortisol in the body, and promote the secretion of neurotransmitters like dopamine, thereby playing a role in relaxing the body and mind and alleviating anxiety. In clinical practice, background music has been applied in scenarios such as operating rooms and icus, and has achieved remarkable results. It can effectively alleviate patients' tension and lower physiological stress indicators such as heart rate and blood pressure. Introducing background music in dental treatment has significant theoretical and practical significance. From a theoretical perspective, this is an exploration of the cross-application of psychology and stomatology, which is conducive to enriching the application theory of non-pharmaceutical intervention methods in oral treatment. From a practical perspective, the application of background music is expected to improve the

medical experience of patients, enhance their compliance with treatment, thereby improving the efficiency and quality of treatment. At the same time, it is also conducive to building a harmonious doctor-patient relationship. This article explores the clinical role of background music during dental treatment, as follows [3-5].

1. Data and Methodology

1.1 Overview

100 patients in our department who met the research criteria were selected to participate in this study and were evenly divided into the study group and the reference group. The study group ranged in age from 18 to 56 years old, with a mean age of (37.23±2.41) years. The gender was 30/50 for males and 20/50 for females. Reference group: Age range: 18-60 years old, mean (39.21±2.39) years old, gender: male 31/50, female 29/50, statistical analysis of all study data, $P > 0.05$, meeting the grouping conditions.

Inclusion criteria: First, all patients participating in this study were ≥ 18 years old, regardless of gender; All patients signed informed consent voluntarily and were emotionally stable without mental illness or emotional disorders.

Exclusion criteria: Patients with a history of mental illness; Involuntary participation in this study; Not fond of music; Patients without complete clinical data [6].

1.2 Methods

Control group: Conventional treatment without background music. Doctors, in accordance with the department of stomatology's operating standards and procedures for treatment, explain to patients the purpose of treatment, treatment methods, and treatment results, and inform the relevant precautions and precautions in detail. At the same time, patients should be given necessary psychological support and comfort, and encouraged to actively cooperate with treatment [7].

The research team: In addition to the usual treatment, the appropriate background music was played. The method is as follows:

Selection of background music: Choose music with soothing rhythm, beautiful melody, and soft timbre, such as classical music and light music; Avoid music with strong, loud, and stimulating beats. The music playing equipment adopts a special sound system specialized in stomatology, and the speaker is placed in an appropriate position in the treatment room to ensure the playing effect of music [8].

Music playing time: Background music is played from the moment the patient enters the treatment room until the end of treatment [9].

1.3 Decision criteria

The intervention effect of the two groups was observed, and the relevant data of clinical treatment compliance, pain degree, negative emotion score, and patient satisfaction were analyzed, and the differences between the groups were compared and analyzed by statistical tools.

1.4 Statistical methods

The statistical data (n%) were tested by χ^2 . Test the measurement ($x \pm s$) using t . All the data presented in this paper are further processed by using SPSS 21.0 data package. If $P < 0.05$ is displayed, it indicates that it is meaningful; if it is meaningless, it indicates that the P value exceeds 0.05.

2. Results

The treatment compliance of patients in the two groups was analyzed, and the total compliance rate in the study group was higher than that in the reference group ($P < 0.05$), as shown in Table 1.

Table 1. Comparison of treatment compliance between the two groups [(n)%]

Number	Number of cases	Complete compliance	Partial compliance	Non-compliance	Total compliance rate
Research group	50	32(64.00%)	17(34.00%)	1(2.00%)	49(98.00%)
Reference group	50	23(46.00%)	20(40.00%)	7(14.00%)	43(86.00%)
P					< 0.05

2.1 Score the pain degree of patients

In the study group, the score was (3.02±1.02) before treatment, (3.72±1.44) during treatment, and (2.41±0.85) after treatment. Reference group: before treatment score (3.15±1.00), during treatment score (4.43±1.56), after treatment score (3.32±0.77). There was no significant difference in scores between the two groups before treatment ($P > 0.05$). The comparison of scores during and after treatment showed that the study group had a lower score than the reference group, with a significant difference ($P < 0.05$).

2.2 The negative emotions of the patients

The negative emotions of the patients in the two groups were analyzed, and the anxiety of the patients was scored using the self-rating Anxiety Scale (SAS), which was divided into three levels, namely, mild anxiety (50-59 points), moderate anxiety (60-69 points), and severe anxiety (≥ 70 points).

Study group: 42 patients (84.00%) with mild anxiety, 8 patients (16.00%) with moderate anxiety, and no severe anxiety. Reference group: 28 patients with mild anxiety (56.00%), 12 patients with moderate anxiety (24.00%), and 10 patients with severe anxiety (20.00%). Compared with the two groups, the study group with mild anxiety was higher than the reference group ($P < 0.05$), and the study group with moderate and severe anxiety was lower than the reference group ($P < 0.05$).

2.3 Patient satisfaction was measured in three grades: very satisfied, generally satisfied, and dissatisfied, and the total satisfaction rate

Study group: 40 cases were very satisfied (80.00%), 10 cases were generally satisfied (20.00%), 0 cases were not satisfied, and the total satisfaction rate was 50 (100.00%). Reference group: 26 cases were very satisfied (52.00%), 15 cases were generally satisfied (30.00%), 9 cases were dissatisfied (18.00%), and the total satisfaction rate was 41 (82.00%). There was a significant difference in total satisfaction rate between the two groups ($P < 0.05$).

3. Discussion

Music therapy is a treatment method based on the physiological and psychological effects of music, which uses musical elements such as melody, rhythm, and harmony to carry out systematic intervention for the physiological, psychological, and social needs of patients [5]. In the field of stomatology, music therapy is often integrated into clinical practice by playing background music as a non-invasive auxiliary treatment method, helping patients optimize and recover their physical and mental states during the treatment process. Clinical background music specifically refers to low-volume, soothing music played throughout the treatment process. Its sound pressure level is usually controlled between 40 and 50 decibels, which can effectively cover some sharp instrument operation sounds without interfering with clear communication and precise operation between doctors and patients, and integrate into the treatment scene in a natural and gentle way. The particularity of the dental treatment environment, such as the clashing sounds of metal instruments, the high-speed operation sounds of dental drills, and the invasive operations on the oral mucosa during the treatment process, can easily induce patients' tension and fear, and even lead to the occurrence of dental phobia [6]. According to research, approximately 60% of patients experience stress responses such as accelerated heart rate and elevated blood pressure before undergoing dental treatment. The introduction of background music provides an effective way to alleviate such negative conditions. From the perspective of physiological regulatory mechanisms, soothing background music activates the limbic system and reward circuit of the brain through the auditory system, prompting the nervous system to release neurotransmitters such as endorphins and dopamine. Endorphins, as natural analgesic substances, can bind to opioid receptors in the central nervous system, reduce the neural sensitivity of pain perception, and effectively alleviate pain perception during the treatment process. Dopamine helps patients generate a sense of pleasure and suppress anxiety by regulating the emotional center. Meanwhile, the rhythm and melody of music have a unique physiological synchronization effect. When the rhythm of music resonates with the activity of the human autonomic nervous system, it can guide the patient's heart rate to tend to be stable and the muscle tension to naturally relax, thereby achieving a state of deep relaxation. At the psychological intervention level, background music plays an important role in diverting attention. The shrill sounds of instruments during treatment can easily trigger patients' alertness and discomfort, while background music, through a competitive stimulation mechanism, shifts patients' attention from the treatment operation to the appreciation of music. Studies show that when patients are immersed in their favorite musical melodies, the attention regulation area of the prefrontal cortex of the brain prioritizes processing the musical information, thereby significantly reducing the

intensity of perception of painful stimuli and negative emotional responses. In addition, the emotional resonance effect created by music can help patients build a sense of psychological security and reduce their strangeness and resistance to the treatment environment. The optimizing effect of background music on the therapeutic environment cannot be ignored either. Traditional dental clinics often present a serious and cold atmosphere due to the dense concentration of instruments and strict operation procedures, which aggravates the psychological burden of patients. The soothing background music can soften the tension of the space. Through the environmental reshaping in the auditory dimension, the consulting room can be transformed into a comfortable space that combines professionalism and humanistic care. The improvement of this environment not only enhances the psychological comfort of patients but also increases their acceptance and cooperation with the treatment process, laying the foundation for establishing a trust relationship between doctors and patients and improving the treatment efficiency [7].

The results of this study show that the comparison of the total treatment compliance rate between the two groups of patients shows that 49 (98.00%) in the study group is higher than 43 (86.00%) in the reference group ($P < 0.05$); There was no significant statistical difference in the pain score of (3.02 ± 1.02) VS (3.15 ± 1.00) between the study group and the reference group before treatment ($P > 0.05$). The comparison of pain scores during and after treatment showed that the study group (3.72 ± 1.44) , (2.41 ± 0.85) VS was lower than that of the reference group (4.43 ± 1.56) , (3.32 ± 0.77) ($P < 0.05$); The negative emotions of the patients in the mild anxiety study group were 42 (84.00%), which was higher than that in the reference group 28 (56.00%) ($P < 0.05$). The moderate and severe anxiety study groups were 8 (16.00%) and 0 (0.00%), which were lower than those in the reference group 12 (24.00%) and 10 (20.00%) ($P < 0.05$). The comparison of the total satisfaction of patients showed that 50 (100.00%) in the study group was higher than 41 (82.00%) in the reference group ($P < 0.05$).

4. Conclusion

Observing the results of this study, the application of background music during the treatment in the department of stomatology has a significant effect. It can improve the treatment compliance of patients, reduce their pain, relieve negative emotions such as anxiety, and enhance patient satisfaction. This result indicates that when patients are in the treatment environment of the dental department, background music can have a positive impact on the physical and mental state of patients through three dimensions: physiological regulation, psychological intervention, and environmental optimization.

4.1 Background music can regulate physiological state

From the perspective of physiological regulatory mechanisms, the sound wave vibrations of background music are transmitted through the external auditory canal to the inner ear and then conducted to the brain center via the auditory nerve, triggering the nervous system to release endorphins, a natural analgesic and mood-regulating substance [8]. Endorphins can bind to opioid receptors in the central nervous system, reducing the sensitivity of pain-sensing nerves and playing a role similar to that of natural analgesics. During the process of oral treatment, patients often experience pain responses due to the vibration, pressure, and other stimuli caused by the operation of instruments. However, the release of endorphins can effectively relieve this physiological pain and significantly reduce the discomfort of patients during the treatment process. In addition, the synergistic effect of music rhythm and human physiological rhythms can also regulate heart rate, respiratory rate, and blood pressure, helping patients maintain a stable physiological state and providing a basic guarantee for the smooth progress of treatment.

4.2 Background music affects mental state

At the psychological level, background music significantly improves the negative psychological state of patients through distraction and emotion regulation mechanisms. In the dental treatment scene, the sharp sounds of instruments, the unfamiliar operating environment, and the expectation of pain can easily trigger negative emotions such as tension and fear in patients. Studies have shown that when soothing background music is played in the consultation room, patients' attention shifts from the treatment operation itself to the music melody, thereby reducing their concern and worry about the treatment process [9]. Especially when playing the music types that patients like, the effect of this attention diversion is more significant. The emotional resonance created by music can activate the brain's reward circuit, promote the secretion of dopamine, and make patients feel pleasant, thereby effectively alleviating anxiety. The reduction of psychological pressure makes patients more willing to actively cooperate with the doctor's operation instructions. Whether it is opening the mouth to cooperate with the examination, maintaining a fixed position, or dealing with complex treatment steps, the compliance has been significantly improved, creating favorable conditions for the doctor to carry out the treatment smoothly.

4.3 Background music to improve the medical environment

In addition to the physical and psychological influences, background music also enhances the treatment experience of patients by optimizing the medical environment. Traditional dental clinics, filled with the metallic clashing sounds of medical devices, the humming of equipment operation, and a serious spatial atmosphere, often increase the psychological burden on patients. The introduction of background music broke the cold and oppressive atmosphere of the environment, making the consulting room full of humanistic care. The gentle and soothing melody makes the consulting room space more approachable. In the relaxing atmosphere created by the music, patients can feel cared for and valued, thus generating positive evaluations of the entire medical treatment process. The improvement of this environment not only reduces the tension of patients during the treatment process, but also enhances the overall satisfaction of patients with medical services [10].

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