Feeling vibrations from a hearing and dual-sensory impaired perspective

Introduction

Working with clients with a sensory impairment, the professional may use a multi- or cross-disciplinary approach adapting various methods or models. This overview presents practical solutions to working with clients with hearing impairments deriving from vibroacoustics (VA) as well as multisensory vibrosensoric experiences. Skille's pioneering work involved "bathing" the body in a low frequency sound bath to relieve pain (Skille & Wigram, 1995: 25). The original idea was to have a spasmolytic or pain relieving effect for children with celebral palsy. Music bath referred to the concept of using bean bags filled with polystyrene balls supporting the client. As the low tone frequency is played, the sound is transferred via the polystyrene balls thus giving a vibrosensoric experience (Palmer & Ojala, 2016). Vibrosensoric experience refers to the combination of using residual hearing in addition to feeling the vibrations. The music played contains pitch, melody, duration and intensity variations. These produce different sensations of tones. The low, middle and high tones are defined by octaves on a piano. Low tones here are the two lowest octaves on a piano, middle range is three octaves around middle C (440Hz) and high tones consist of the two highest octaves on a piano. (Lahtinen & Palmer, 2005: 14). Furthermore, when a client has a dual-sensory impairment, i.e. both visual and hearing impairment, some of these musical elements may have to be presented using hands-on methods, e.g. touch messages called haptices connected to music (Palmer & Ojala, 2011, Palmer, Lahtinen & Ojala, 2014; for more general information on haptices, please see Lahtinen, 2008: 142-143).

Some researchers have expressed a concern about using music and low tone frequencies together (Punkanen & Ala-Ruona, 2012). Possible clashes between musical and low tone frequencies depend on the music style being applied. In the case of matching low tone frequencies, there is no musical disturbance, but it creates a vibrosensoric experience for the client (Palmer & Ojala,

2016). Romanian researchers define VA treatment as "the conversion of musical melodies and rhythms into waves that can be felt within the patient's body" (Ailioaie et al., 2012). Similar remarks can be found in various works of Skille and Wigram (Skille & Wigram, 1995, Skille, 1997a, Wigram, 1997). This appears to confirm that the combination of music and vibrations provided by vibroacoustic (VA) techniques allows hearing impaired clients to benefit from this approach of music therapy (MT) more so than other approaches.

Multimodal refers to the application of low tone frequency, e.g. 40 Hz and music played simultaneously through headphones. Multiple stimuli refers to the application of low tone frequency, and simultaneous music through a VA device. When applying low tone frequency through a VA device, there is a pulsating frequency, which may be aimed towards a specific area on the body for pain management. At the same time the therapist is able to control the volume and sensation of the stimulus. Even when the sound source is stable, that is, staying in one area of the body, the client feels that the sound is travelling across the body. This is due to the cells in the body containing liquid which is a good conductor of sound waves, so any external stimuli will be dispersed all the way through the body. This allows the client to become relaxed and prepares him/her for an additional music stimulus to be possibly applied and listened to. The music controlled by a CD player begins with volume control at zero, then it is gradually increased depending on the style of music being used. For example, if the music is very rhythmical, one does not want to have overstimulation as this can cause the client to become restless (e.g. Dewhurst-Maddock, 1997: 109). However, when applying calming music as defined by Wigram (1997: 226-7) as well as New Age music (relaxation music), the music vibrations in the lower range may be amplified, because of the summation of frequency peaks (Ladefoged, 1996). Thus, it may be necessary to adjust the volume level somewhat. The therapist may place their hand onto the chair or the VA device. If the vibrations feel too strong it is necessary to decrease the volume.

Techniques used in a music therapy session can be applied depending on the device you are using for 15-40 minutes but the most common duration is 23 minutes (Skille, 1989). This is due to the intensity of the low tone frequencies being received from the devices. In some cases VA may incorporate music listening into the equipment and this needs to be carefully balanced against the low tone frequencies so there is no danger of overstimulation as this could cause nausea aftereffects for the client. It is important for the therapist to monitor the client's responses during the treatment programme (e.g. body language smiling, breathing rate). For further discussion on facial expression and body language reliability on treatment responses please see Bergström-Isacsson, (2013).

The therapist might use their hands or a small balloon to feel the device to enable to check and adjust volume and frequency levels (Wigram, 1997). Sometimes the audio/listening methods may not be as precise or as accurate as following the vibrations produced by the VA devices with the hand using the sense of touch.

Clients with Hearing Impairment

When working with hearing and dual-sensory impaired clients, there are some challenges for the music therapist (Kerem, 2009). The communication during the session is affected by the fact of whether or not the client wears hearing aid devices, for example, sign language users tend not to use hearing aid devices. Some of devices may be set up to amplify all sound sources causing disturbance or disorientation if the music created or played is too loud. This will make it more difficult to differentiate musical elements and tones. To correct for this, it may be advisable to ask the client to adjust their devices accordingly using their preferred communication method. If headphones are used, sometimes the user experiences whistle-like feedback. Some digital devices may have automatic volume settings. Cochlear implant (CI) users may require a specific time period for adjustments to the new soundscapes within the programming sequence of CIs in the rehabilitation process.

If a hearing impaired client does not use hearing aid devices, another approach will be necessary in order to introduce musical elements to the client. In this case, the client may experience the rhythms and vibrations only through the sense of touch. Experiencing and feeling musical vibrations is individual. Therefore, it is necessary merely to adjust the quality of the sound through the equalizer settings, not to increase volume levels.

Practical clinical approaches

Vibroacoustic and Physioacoustic Therapy Devices

Basic electronics incorporated into VA devices may include transducers for low tone frequencies and/or speakers for music (Boyd-Brewer & McCaffrey, 2004). Some VA devices may be low tone frequency based using a series of pre-recorded CDs (Skille, 1989, Skille, 1997b). These are specially designed programmes covering a broad range of low tone frequencies [30-120Hz] Skille and Wigram, (1995). Skille mentions [40-80Hz] as being the most effective to be used during a VA session in a therapeutic process. Lehikoinen specifies using the Physioacoustic (PA) chair with frequency range of [27-113Hz] in treating pain and stress-related symptoms in health and educational settings (Lehikoinen, 1997). For example SoundOasis or a physioacoustic chair allow both low tone frequencies and music to be played together, either of which can be adjusted according to the treatment given. The most widely spread VA devices to date are the Norwegian Multivib (handheld transducer, cushion, mattress), the Finnish Nextwave PA chair, and the American Somatron. Other devices, such as the Taikofon cushion can also be used in music therapy.

Sensations of Tones - A Practical Approach

Using balloons enables people with a hearing impairment to understand how they can feel musical tones through their bodies. If one holds a balloon between the hands when prerecorded music is played, it is possible to feel different tones from the music (Lahtinen & Palmer, 2005). Bass tones can be very strong and be felt in the lower part of the body. Similarly, the middle and upper ranges can be felt in the middle and upper parts of the body, depending on the intensity of the vibrational source. These can also be felt through the balloon. With the upper register one can also feel the tones from the fingertips and feel the vibration through the scalp (Lahtinen & Palmer, 2005, Wigram, 1997: 154). Sound waves travel through air and water, as defined by several studies and research groups (Helmholtz, 1877/1954, Ladefoged, 1996 and others). The way sound travels through media can also be used in vibro- and physioacoustics. In this way we enable the hearing impaired clients to experience music through different vibro- and physioacoustic devices and to experience music-induced relaxation.

Balloon Exercise

Sometimes there are no VA or PA devices available. In this case, it is possible to recreate this "tone sensation" experience using balloons where there is a wooden floor with a good quality music Hi-fi system. For example, if one holds the balloon in front of the chest standing in front of the music speakers, the vibrations will feel very strong. If one moves away, the vibrations will be weaker, but the client will still be able to feel the sound waves via the balloon. That is because of the power of sound is diminished by the square as the distance doubles. One can also study different material and texture resonances using balloons. In addition, beanbags act as a conductor to enhance the rhythms and vibrations from the music. This idea is similar to the one Skille refers to as a music bath (Skille, 1997a, Skille, 1997b).

It is not necessary to have the music very loud and the same experiment can also be accomplished using different types of configurations. This can be a very good way for all people to

understand how we are able to feel the music through our bodies and to explore the different kinds of tonal elements (low, middle, and high tones). "In music, vibrations producing *low tones* can be felt by body in the feet, legs and hips. The *middle tones* can be felt in the stomach, chest and arms, similarly the **high tones** can be felt in the fingers, head and hair" (Lahtinen & Palmer, 2004: 14, highlighting original, spelling corrected to the current use, NB: felt in the hair should be felt through the vibrations in the scalp). When singing, vibrations from the nasal cavity travel to the lateral ventricles causing them to vibrate (Jindrak postulate), see Boyd-Brewer & McCaffrey, (2004). In their research, Skille and Wigram outlined the body areas which respond to different frequency ranges (Skille & Wigram, 1995: 54-5, Wigram, 1997:154).

Feeling Music - A Vibrosensoric Experience

The approach of feeling music encompasses the vibrosensoric experiences (Palmer & Ojala, 2016) within a relaxing environment especially for clients with a hearing impairment, as well as those with multiple disabilities. Skille focused on a wide range of issues and treatments (Skille, 1997a, Skille, Wigram & Weekes, 1996) that can be obtained with VA. The approach presented here focuses on a vibrosensoric experience for people with impaired hearing. One aspect that differs from someone with hearing is that the client with a hearing impairment is perhaps able to feel greater sensation through the body. Does this indicate that dual-sensory impaired people are even more sensitive to the information gained through touch compared to others?

During a music therapy project in Norway at a residential school for children who were deaf and had profound learning disabilities in Andebu (1992-3) using a dedicated vibrating music floor with prerecorded music (popular to New Age) appeared to improve some individuals' wellbeing. Similarly to Skille, different frequencies appeared to help with different issues. To mention one example, similar relief was noticed for one of the clients about digestion problems. These results are, however, anecdotal but do indicate some baselines for future research projects.

Selection of Music Styles

For clients with a hearing impairment to feel and gain a holistic expression of music it may be appropriate to select certain prerecorded music styles that are instrumental, and have a good, constant rhythm or clear melody. This may be due to the way the music is orchestrally arranged or otherwise making the rhythm or melody easier to follow from a hearing impaired perspective. Furthermore, the range of tones and vibrations produced via VA devices enables the client to relax more during a session. Repetitive music can be therapeutic for clients who are visually impaired and have multiple disabilities. This was found during a project in Norway (see above chapter Feeling Music - A Vibrosensoric Experience). The suggestions above do not mean that classical music cannot be used, but from a hearing impaired perspective the tonal levels within the various music styles may not be strong enough or consistent enough for the client to experience the vibration.

Some New Age music can be very therapeutic due to the way it is arranged, mainly in a slow, repetitive manner along with ascending or descending tonal soundscapes. Music like this has a positive role to play in a therapeutic process. Skille refered to the use of prerecorded, commercialised music in particular to enhance the bass frequencies of jazz and other styles (Skille, 1997b: 237). Furthermore, Wigram indicated during his work with clients with profound learning disabilities that he used classical music in the sessions (1997a, b).

There has been some specially recorded music produced in the 1990s by the composers Otto Romanowski, Matti Kärki and others, which encompasses low tone frequencies with music added on top in order to create a relaxing environment (Skille, 1997b). These are specifically aimed at some of the VA and PA devices, such as a sound massage bed or a PA chair, which are more pure tone-related and penetrate to a person's body more easily (Skille, 1997a, Lehikoinen, 1997). These may not be so suitable for some very hypersensitive people. In the case of hearing aid or cochlear implant users, these deep tones can cause distortion and disorientation. Of course, it depends on an

individual's taste on what they want to experience and try out. The music may also relate to some significant past experiences.

Portrayal of Music to the Front and Back of a Person's Body

In a therapy session with a hearing or dual sensory impaired client, two exercises can be used to enhance understanding of how to feel musical rhythms and elements through the body. The client might want to close their eyes during the session. This will enable the client to concentrate on the vibrations of the music and to experience switching senses. The switching of senses refers to when a hearing impaired person may switch off their hearing aid devices and just focus on the pure sensations from the musical vibrations flowing through their body. This also allows the client to switch off the auditory channel and the other senses sharpen as a result (Kandel, 2000).

During this exercise, the client receives the rhythm portrayed by the therapist tapping the structure of the music used during the session on the client's upper back. In the case of rhythmical elements, one can tap the rhythm on the client's shoulder and where there is a melody going through the tonal ranges, it can be expressed using the hands spread out on the client's upper back. If there are low tones, the hand is brought down lower on the back, and the upper register is higher up on the shoulder level; the hands are used as if drawing a picture following the rhythm and melody of the music. Furthermore, if the music is dramatic it can be expressed by mimicking a fireworks pattern on the back.

A second exercise would include working face to face. Here the therapist uses hand-to-hand contact and moves his/her hands to the flow of the music as the client follows the movements. During this exercise the pair is standing still and not moving around the floor. They can, however, sway to the music. This is one more example of how one may feel the rhythm of the music.

Feedback and observations

For more than 25 years, the methods outlined here have enabled hearing impaired and dual-sensory impaired clients to find a new way of how to feel and experience music through their bodies according to the clients' feedback. For those with multiple disabilities, the results have also been positive through video analysis - recording reactions, expressions of joy, laughter, and additional movement they would not have done before. For example, a 13 year-old hearing impaired female client loved male voices, such as Don Williams, country music and a soundtrack with East Asian instruments. When the therapist held up the tambourine, the only way she communicated with him was to tap the tambourine as the music was being played through a VA floor. This particular client had very limited mobility and suffered from spinal sclerosis, which required external support, but her hands were mobile and she had vision.

In a group session for five adult dual sensory impaired clients, they were able to create music together as a group using the African drums, tambourines, and shakers. This was a very positive result, just as making creative music together made them forget their own disabilities just for this brief moment. This is an illustration of a socialising effect. Some clients with multiple disabilities have problems with daily living skills such as concentration, a weak bladder, or tension. These methods - feeling music through the body using either VA music floors or other means - have enabled them to take more control of these daily living problems by sound massage of the organs.

Summary and Conclusions

This article has focused on clients with hearing or dual-sensory impairment and the techniques outlined can be applied with this client group. Perhaps one needs to consider a new approach to the way we can feel and experience music - instead of listening to the music auditively, they need to learn how they can feel the vibrations and musical elements through their bodies. This knowledge has taken over 25 years to reach through using different types of VA/PA devices. How-

ever, it is appreciated that not all venues have these facilities available. That is why it is needed to take one step back to consider how one is able to feel the musical tones using balloons or smaller types of music equipment. To achieve this understanding it may be appropriate for therapists themselves to carry out some practical exercises as mentioned in the article, either individually or as a group, and to share their experiences of feeling music and how they felt. This is the only way we appreciate how hearing impaired clients respond to music through vibrosensoric experience.

It should be noted that sometimes hearing impaired clients may need to use interpreting services in order to communicate before, during, and after the therapy session. Communication may not always be simple between client and therapist for those with hearing impairments, so interpreting services may be needed. Furthermore, if the client chooses to use an interpreter, the therapist will get more positive results if the interpreters are such that the client feels confident and comfortable working with. Particularly in the case of dual sensory impairment, the client needs time to get to know the interpreters due to the different communication methods appropriate in the therapeutic process.

Vibrational sensitivity can be particularly useful for client with a dual-sensory impairment in relieving stress, reducing leg pain, shoulder tension, increasing confidence, and general wellbeing. The same effects have been found by other authors (Ailioaie et al., 2010, Wigram, 1997). These effects can also be seen in the rehabilitation process.

Furthermore, clients with multiple disabilities with a hearing impairment would also benefit from VA. This can be provided as a part of their daily living skills programme. The application of synchronised rhythms, movements, and relaxation using different styles of music enables special needs clients to improve their mobility, concentration, and general coordination skills. This is due to certain musical styles and the frequencies used producing constant rhythms and vibrations to the body.

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