



## Therapy in Praxis

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**THERAPY IN PRAXIS**

**Therapeutic Listening®**



**Vital Links**  
continuing education  
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### Overview

The differences between hearing and listening

- Hearing occurs passively and involuntarily as sound is received through the ear structures. This passive act does not involve the direction of attention to sound.
- Listening is an active, voluntary process. It involves selecting sound and directing attention to focus. Listening involves the desire to communicate and the ability to focus on certain sounds for discrimination and interpretation, [Frick, 2001].

### Why is listening important?

Listening is the basic precursor to interaction, speaking, reading and writing and relates closely to attention and concentration. Additionally, sounds provide information about our environment relating to time and space. Sounds provide us with an ability to organise our perceptions of ourselves and our environment, [Frick, 2001].

### Sensory Integration & Sound Technology

During treatment, it is typical to look at how a child's sensory systems are integrating and processing the information from their environment. All of the senses [tactile, movement or vestibular, proprioceptive or muscle / joint awareness, hearing, smell and vision] help to facilitate a child's understanding of their world and enhance their skill development. Dysfunction in one or more of these senses can impact how a child perceives their world, therefore affecting their functional development.

A growing number of specialist therapists are beginning to incorporate sound-based technologies and methodologies into their practice. Currently the treatment of sensory processing disorders impacting sensory modulation, regulation, sensory discrimination and motor planning are being treated using sensory integrative techniques. This involves directly accessing the tactile, visual, vestibular and proprioceptive systems. Over the past few years the methods to incorporate auditory system in to therapy have become more available and affordable.

The therapists in Therapy in Praxis have been trained in a variety of listening programs. With this we are in a position to assess your child and make recommendations on which type of listening programme would be most beneficial for your child.

### Functional Neurological Connections of the Middle Ear



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The auditory system highly impacts the development and perception of our senses. This first occurs in utero and continues throughout our adult life. Frick [2001] explains that the middle ear muscles are closely connected with the parts of the nervous system that control facial expression, speech and visceral responses. These connections function together for the purpose of promoting social behaviour and communication.

Examples of neural connections between the muscles of the middle ear and the jaw, facial muscles, voice and physiological centres of the body include:

- The vagus nerve involved in regulation of the cardiac, respiratory, digestive and eliminatory functions is responsible for our visceral responses to sensory input and has a sensory branch to the tympanic membrane of the ear.
- The trigeminal nerve which is responsible for motor control of the jaw and sensation to the face joins the ear at the tensor tympani [inner ear muscle].
- The facial nerve controls the muscles of facial expression and is connected to the middle ear via the stapedius [inner ear muscle]. This connection contributes to the non-verbal portion of the language including facial expression.

It is also very important to recognise the close relationship of the auditory and vestibular system. In therapy we typically address the vestibular system through movement-based activities. However another efficient way to increase the input to the vestibular system is through the auditory system. The structures of the ear [cochlea] are anatomically connected to the vestibular system which reside in the inner ear [semi-circular canals]. The auditory and vestibular system has a close relationship and they serve as a reference point from which all sensation is organised. The vestibular system orients the body in space with the auditory system which helps us to navigate through the space. Our body ear or vestibular system is instrumental in developing our:

- Orientation to gravity
- Awareness of movement through space
- Influencing anti-gravity muscle tone
- Co-ordinating the head and eye movement
- Co-ordinating the two sides of the body
- Arousal, Attention and Self-Regulation
- Integration of all sensory systems for organisation
- Development of body scheme

Through a complex neural web all of the sensory systems integrate at the level of the brainstem in a way that impacts arousal, self-regulation, emotion, respiration, postural



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adaptation, visual motor skills and oral motor skills. It is here in the brain stem that the process of sorting and filtering sounds begins in order to integrate them with the body senses [tactile, vestibular, proprioception and visual]. In the brain stem an integration of ALL of our senses occurs. This is reflected by adequate sensory processing and skill refinement. Therefore just as sensory integration affects changes at the level of the brain stem, so can Therapeutic Listening.

Currently there are several sound stimulation programs available to children and adults. These listening programmes are uniquely designed to provide the auditory system with an intensity that cannot be gained through conventional therapy techniques.

### **Therapeutic Listening®**

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Therapeutic Listening was developed by Occupational Therapists Sheila Frick, OTR/L and Colleen Hacker, OTR/L and uses sound training in combination with sensory integrative techniques which emphasise vestibular stimulation and postural movement strategies and allow Therapists to approach the auditory and vestibular system directly.

Sound training uses electronically altered music that has been designed to produce specific effects on listening skills when the child follows a prescribed program.

Listening skill difficulties are the inability to accurately perceive, process and respond to sounds and are often found to be an integral part of other perceptual, motor, attention and learning difficulties affecting a large number of our children. Therefore, listening becomes a function of our whole body, not just our ear.

Hearing, a function of the ear is passive and does not involve the direction of attention to sound. Sound is received by the ear and passed along like a microphone.

Listening is active and requires the desire to communicate and the ability to focus the ear on certain sounds selected for discrimination and interpretation.

### **Development of Therapeutic Listening®**

Therapeutic Listening integrates a number of electronically altered compact disc, based on the ideas and technology created by Alfred Tomatis, Guy Berard and Ingo Steinback, within a sensory integrative frame of reference. Tomatis developed his theory in regard to the development of hearing in utero and the impact of an auditory stimulus on all aspects of development including movement processing. He recognized the sensory integrative value of an auditory stimulus.



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Dr. Guy Berard trained and worked with Dr. Tomatis. Berard developed his own device and protocol to reduce the time required to produce results. He emphasised the auditory stimulus impact on behaviour and language.

Ingo Steinback was influenced by Dr. Tomatis. He developed Samonas sound therapy which is based on the principles of music therapy in accordance with development aspects and natural laws of physics related to sound. He emphasizes the global impact of specific auditory stimulus on physical, emotional, and energetic development.

### Who can benefit?

Anyone with the following difficulties would benefit from Therapeutic Listening;

- Has difficulty understanding speech in noisy situations
- Is easily distracted
- Has impulsive behaviour
- Has trouble hearing in groups
- Has trouble listening
- Seems to hear, but not understand what people say
- Discrepancy between verbal and performance scores and IQ tests
- Has difficulty following directions
- Has trouble remembering what people say
- Has poor speech or language skills
- Has poor reading or phonics skills
- Has poor spelling skills
- Becomes anxious or stressed when required to listen
- Is disorganised
- Has poor peer relations
- Has poor self-esteem

### How it works

The sound stimulation used in Therapeutic Listening appears to set up the nervous system, preparing ground for emergent skills. The music causes the muscles in the middle ear to contract, helping to discriminate and modulate sound input. In addition, there are tiny bones in the middle ear that vibrate when sound is provided, stimulating the movement (vestibular) and hearing (auditory) sensory receptors in the inner ear. This sensory information is sent throughout the central nervous system causing a multitude of reactions.

There are four nerves, which are impacted by sound therapy and travel from the inner ear to the brain and back to other parts of our body. For example, when providing sound



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therapy you may stimulate the facial nerve. The facial nerve innervates the muscle in the middle ear as well as the muscle of facial expression.

Along with this nerve also travels the glossopharyngeal nerve, which controls the motor components of one's voice. Therefore, the muscles of the ear, which are designed to extract the human voice from a noisy background (listening), are linked with the muscles of facial expression and voice production. When you are talking with someone you rely on the non-verbal facial expressions of the person who is listening to you. So, again these same muscles are necessary for producing clear articulation and for hearing accurately and efficiently. So, through the use of sound therapy, such as Therapeutic Listening, you are stimulating the muscles of the ear as well as the muscles of the mouth, because the nerves that innervate these muscles are the same nerves.

### Equipment Used

Therapeutic Listening consists of a series of CD's prescribed specifically for each child over specifically designed headphones and work on a variety of skills. Listening time consists of 2 times a day, each for 30 minutes, with a minimum of 3 hours between listening times.

The CD's are electronically altered or passed through a high-low filter. This means that the frequencies at which the sounds are heard vary. Some CD's jump from very high frequencies to very low frequencies and back and other CD's do the same, but the variance is much less and therefore not as intensive for the listener.

Here are some examples of CD's and the skills that are being worked on:

**EASE 1 and 2:** hypersensitivity to sound, movement and/or touch or defensive responses to sensory input in general

**Mozart for Modulation:** supports organized body movement, attention within the environment, active engagement, language

**Kidz Jamz (Grape):** helps with postural organisation, sensory modulation and attention difficulties

**Vivaldi for Modulation:** supports focus and concentration; supports suck-swallow-breath, heart rate and respiration, improves processing of auditory input in complex auditory environments.

### Functional outcomes for the child or young person

- Decreased tactile hypersensitivity or defensiveness



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- Decreased oral hypersensitivity with increased exploration and acceptance of different foods
- Improved self-regulatory behaviour such as a more regulated sleep cycle, more regulated hunger thirst cycle, more regulated such-swallow-breathe pattern, more regulated respiratory control and decreased stress
- Improved balance
- Improved coordination of movement within the environment
- Increased postural organisation
- Increased motor skills, both gross and fine
- Improved bilateral motor patterns
- “Emergence” of motor planning
- Improved spatial-temporal organisation
- Improved handwriting
- Improved visual-motor skills
- Improved timing of motor execution
- Increased and more elaborate social interactions, with better “timing”
- Discrimination of the dimensionality and directionality of spatial concepts
- Improved components of communication such as greater range of non-verbal communication,
- Improved/clearer articulation, greater emotional and verbal expression and improvements in pragmatic language

*Parts adapted from “Listening with the Whole Body by Sheila M. Frick, OTR/L, and Colleen Hacker, MS. OTR/L.*