Dancing in the Rain: Music to Complement LDN

Applications of Music to Support Patients and Complement Effects of LDN

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The Impact of Music on Biochemistry

Scroll down on the link below to read the short article with an overview about music's effect on neurobiochemistry:

- The Impact of Music on Biochemistry

- **There are also neuroanatomical responses to music, including changes in frontal asymmetry.**

Scope of Presentation

Connections for LDN with Music -

- **Types of Music Engagement**
- **Potential Effects**
- **Precautions**
- **Potential Goals**
- **Explanations for Why Music Works**

Types of Music Engagement

- Listening to Music
- Singing
- Dancing/Moving to Music
- Playing an Instrument
- Composing Music
- Discussing Music
- Conducting Music
- Performing Sign Language to Music

Potential Effects

This presentation will examine effects in these areas of functioning:

- **Motor**
- **Cognitive**
- **Language**
- **Social**
- **Emotional**
- **Spiritual**

Drumming as an Example for Playing an Instrument – Explanation for Why It Works to Target Goal Areas

Drumming is one type of music engagement and has applications for many areas of interest related to LDN Research.

How Drumming Changes Your Brain

Drumming and the Frontal Lobe

- During drumming workouts your FRONTAL LOBE enables you to plan, strategize, and execute grooves. It adjusts your body to perform grooves with attention to detail while performing difficult movements at the right time and tempo. Drumming strengthens the consciousness function of the frontal lobe by requiring complex thinking. Strengthening your frontal lobe is known to increase: creativity, memory, decision-making, focused attention and brain power.

Drumming and Parietal Lobe

- **Your PARIETAL LOBE is active in drumming as it processes the sensation you feel from your hands or sticks on the drum and the auditory cues from the instructor and the music. It also engages language processing when rhythms are presented verbally. This area benefits greatly from environmental stimulation.**

Drumming and Temporal Lobe

- **Your TEMPORAL LOBE allows you to process the sounds and pitches of the drums, rhythms, and music, as well as your breath during your drumming workout. This area helps to recall sequences of patterns and feelings associated with success or failure when performing, verbalizing, and thinking about a challenging groove.**

Drumming and Occipital Lobe

- **Your OCCIPITAL LOBE allows you to see notes on charts as well as the visual cues from your instructor or bandmates. You can also view the parts of your instrument to play for your movements – visuo – motor integration.**

Drumming and Cerebellum

- **Your CEREBELLUM is highly active when you are working on sequenced hand movements, the timing of patterns, and when you execute muscle coordination. Your motor memory (knowing grooves without having to think about them) and improvisation also come from the cerebellum.**

Therapeutic Uses of Percussion

Kalimbas, steel pan, and harp all elicit calming/relaxing at the same time that they elicit inspiration/excitement. They provide a relaxing way to be energized – whether listening to them or playing them. Not many types of engagement have those properties occur simultaneously as they are usually in opposition to each other.

Goals in Therapeutic Uses of Percussion

- develop emotional expression and redirection
- provide outlet for tension and energy release
- facilitate energy
- decrease feeling overwhelmed by anxiety, depression
- increase positivity - about trying new things, more positive about future, have something to live for
- build social interaction – building sense of community
- increase resilience

More Therapeutic Percussion Applications Effects

- build confidence
- build ability to not be upset by mistakes
- increase attention focus –intellectually and mentally to focus off negative and onto positive
- facilitate alertness
- build memory, decision – making, creativity
- increase immune functioning, decrease inflammatory response, decrease in stress hormones
- improve sleep

Drumming Circles

Term frequently misused when describing percussion group playing-

the term references the spiritual use of drumming to induce a trance in Native American spirituality but is often misused/appropriate by other cultures to refer to percussion groups with different goals not related to trance induction or to target spiritual goals

Therapeutic Drumming

- Your brain regulates autonomic functions and allows you to be alert, active, and attentive while learning new grooves.
- The art of drumming engages practically every area of your brain at once. Neuroscience is proving what drummers have known all along … Drumming is where Health and Happiness begins!
- Therapeutic drumming = drumming for purpose of making positive shift in physical, emotional, intellectual or spiritual aspect of participants

Royal College of Music Drumming Study in London

- Health Benefits of Drumming
- **Kalani talking about a published study showing measurable health improvements from participation in therapeutic drumming. Anxiety, depression, social resilience, and inflammatory immune response among mental health service users after 10 sessions – 30 participants**
- **Royal College of Music in London did the study**
- **Effects of Group Drumming Interventions on Anxiety, Depression, Social Resilience, and Inflammatory Immune Response among Mental Health Service Users – 10 week long study – participants in group drumming showed measurable changes and improvements in anxiety, depression, social resilience and inflammatory immune responses – all in positive manner –**
- **more info with stats and responses found through this project:** Making Music for Mental Health

Research on Group Drumming

https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4790847/

https://www.rcm.ac.uk/about/news/all/2016-03-16rcmfindsdrumminghaspositiveimpactonmentalhealth.aspx

Research Design

30 people to participated – all were volunteers –

Those in drumming group self-selected to be in the drumming group. They did have a control group of people not interested in doing drumming. They participated in social activities but not in musical activities. The music group was led by a professional drummer, not a therapist.

The participants received drumming instructions, not therapy. They learned to play djembes, simple rhythms, performed in simple ensembles, and eventually play in an ensemble/performance, participated in improvisation, jamming and rhythm games – making sounds to water.

The structure involved 10 ninety minute sessions and used measures for scales and saliva samples to measure biological responses.

3 Months Post Study Results

At the conclusion of the study they remeasured the parameters, and for the most part, the positive changes remained.

The people participated in community drumming classes/lessons – primarily musical in nature, not a process oriented model. The talking part of the time together represented only 20 % of the time.

Statistically significant benefits were found, ruling out other reasons for positive shifts – is believed it was probably the music that caused the results. Further research needs to be replicated with more participants over time

Leader and Participants Talk about Grant

Here is the person who led the drumming in the Royal College of Music study and the people assisting him talking about it along with people who attended sharing how it was helpful:

making music for mental health grant

More detail for results

- 6 week and 10 week workshop – drum together, learn drumming, explore the drum –10 weeks - attend focus groups and interviews – psychological scales were used in the measures – 20 % decrease in anxiety, 38 % decrease in levels of depression maintained for 3 months
- single session led to decreases in stress hormones and improvements in immune function – entire 10 weeks led to reductions in levels of inflammation in patients – same as produced by drugs used for mental health
- analyzed info from interviews and focus groups – found that drumming facilitated experiences of positive emotions and a sense of accomplishment, led to increase in self esteem and provided new and enhanced social interactions - overall, participants felt more engaged and more in control of their lives

Why Drumming Enhanced Mental Health

1. specific features of drumming provided non-verbal form of communication as well as a grounded and rhythmic experience that both generated and liberated energy;

2. specific features of group which materialized as a space of connection - able to feel acceptance, safety and care as well as forming new social interactions;

3. features of learning environment framed learning music as a very inclusive activity where the concept of making mistakes is dissolved and a very embodied process is facilitated by an expert musical leader

How People Felt Afterwards

- Could think ahead that he had something to live for
- More positive about trying new things, more positive about future – when she goes home, they see how happy she is
- New projects with new questions about impact of music on mental and physical well-being

Gains Noted by Participants in Royal College of Music Study may be useful to LDN research

Implications for new projects with new questions about impact of music on mental and physical well-being are potential for LDN research in future.

Benefits of Drumming for Body and Mind

- **Music Energetics – Paul Grout - The benefits of drumming for the body and mind - healing through music, rhythm, and sound**

The Health Benefits of Drumming for the Body and Mind - YouTube

Types of Benefits

- health and happiness, social interaction with other musicians
- drum when feel stressed, anxious, or angry
- allows to channel emotions into drum beats
- can be powerful, positive and uplifting
- feelings inside one eventually replace any negative emotions
- allows one to shift focus and attention to do something constructive
- 5 minutes of drumming after day of hard work allows release of tension within body and to feel more relaxed and better prepared for challenges that may come

More Types of Benefits

– can be happy, have fun and enjoy life
– can connect to my inner child
– a universal language
– a form of human expression
– vast healing benefits to body, mind and spirit
– helps build confidence, self-esteem, and immune system
– helps to release negative emotions and trauma
– encourages body to create and release chemicals - endorphins
– chemicals are released with vigorous and intensive exercise – can relax
– Drum is a simple and powerful instrument

Neurological Organization Affecting Responses

Brain is divided into left and right hemispheres

left = functions: logical, analytical and verbal;

right =creative, visual, and intuitive ability

- drumming allows right and left brain to work together to achieve hemispheric coordination
- both work together for heightened sense of awareness
- alters consciousness through rhythmic entrainment
- billions of neurons communicate with one another
- brain's ability to change brain wave frequencies – beta, alpha, theta – has dramatic factor on how successful we are at managing stress; beta = normal state of consciousness; alpha = daydreaming or practicing mindfulness meditation; theta – sleepyhead mode
- brain waves are altered by becoming synchronized to the beat; body will eventually entrain to a beat presented

Recap from Paul Grout

- – drumming can help with well-being and happiness;
- -provides foundational support to learn other musical instruments;
- -he believes people do better when joining in with others, so he recommends joining a drumming group;
- -learn basic techniques; excessive drum playing can cause pain in arms and hands;
- -He finds drumming groups to be analgesic, exciting, sociable, and supportive - can express emotions to other people without having to verbalize them which he found comforting;
- -drumming can help overcome psychological and emotional conditions such as stress, anxiety, grief and trauma, sleep disorders and other things

Applications from Paul Grout's video

- feelings inside one eventually replace any negative emotions
- allows one to shift focus and attention to do something constructive
- helps to release negative emotions and trauma
- encourages body to create and release chemicals - endorphins
- chemicals are released with vigorous and intensive exercise – can relax

- More implications that may be useful for future LDN Research

- Therapeutic drumming = drumming for purpose of making positive shift in physical, emotional, intellectual or spiritual aspect of participants

Drumming for Health and Well-Being

Drumming for Health and Well-Being

- **references his drum lead as the heart beat**
- **empty out of mind anything of anxiety, anything negative – replace it with feelings of peace**

Items Related to LDN Patient Tracking List

Copying from the LDN Health Tracker App:

Patients can track all aspects of their health and keep a journal, and can allow their doctor and/or pharmacist to monitor them if they choose. Keep track of the changes to the LDN dosage, and how it affects these key life markers:

- Quality of Life
- Sleep patterns
- Pain
- Mood
- Energy

Music Applications for Quality of Life, Sleep Patterns, Pain, Mood, Energy

While many types of music engagement target these arenas, harmonica is one that has pulmonary benefits along with remediation for these areas.

Quality of Life:

- **Example of Calvin**
- **Example of Jim**
- **The average healthy person with no medical issues loses 50 % of lung function by age 70. Gains in pulmonary status are typically noted in peak flow, expiratory force, inspiratory force, and total lung volume (vital capacity) when long, slow tones on chords or chugging are used to play harmonica. Gains of over 200 % in inspiratory force are typical immediately across types of pulmonary conditions when harmonica is used in these ways to target pulmonary function instead of to play individual melody notes.**

Reason over 200 % increase in peak flow is usual gain immediately when person starts playing harmonica in ways to target pulmonary function

- The harmonica is the only thing in the world that provides that strong of a level of resistance when using inspiratory force that results in a statistically significant change in pulmonary status. When people start to play harmonica by either using long, slow tones on chords or by chugging (rapidly inhaling alternating with exhaling as in blues playing), there is typically an increase of 200 % noted in inspiratory force - obviously an amazing statistical response. Peak flow measures are made up of measures of inspiratory force and expiratory force, so the increase in inspiratory force will also affect the peak flow measure. Playing harmonica by playing the melody notes does not have any statistically significant effect on pulmonary status.

Dr. John Schaman – Medical Harmonica

Dr. John Schaman has developed a medical harmonica with stainless steel reeds which allow it to be washed in a dishwasher. His harmonica is built to provide good resistance when inhaling and uses 4 chords. It is the same size as a regular diatonic harmonica but is constructed differently.

He runs a large clinic in Canada with very impressive success with his patients.

Check out his web site:

https://www.harmonicamd.com/

If you have Spotify, you can listen to a podcast in which he interviews me, and we both talk about our work using harmonicas for health purposes:

When a Medical Problem Meets a Musical Solution

Musical Mood Induction

- **Musical Mood Induction is a technique that can be useful with your LDN Health Tracker App.**

- **Musical Mood Induction involves beginning with person's presenting mood/mind state and gradually vectoring mood of music over 20 minutes to change person's mood to match mood of music presented via entrainment - realistically can expect to get to neutral in 20 minutes**

- Neuroscience Model for Musical Mood Induction: Research Findings Applied for Clinical Use

Dichotomies Used in our most recent Musical Mood Induction Research

fearful/scared → safe, secure

lonely/isolated → loved, connected

sad → happy

stressed/overwhelmed → calm/peaceful

emotional hurt → contentment

physical pain → relaxation

fear of future/anxious → hope for future/confidence

tired → energized

bored → excited, cognitively/emotionally stimulated

angry → contentment

doubt → confidence

guilt → emotional freedom

mood stabilization

LDN could engage in research for Musical Mood Induction

- Specific properties of music have been found to be associated with specific mood responses to music. You can review the Google slides on Musical Mood Induction in a previous slide to explore my early research at the World's Fair in New Orleans and my more recent research with lists of songs used for the mood/mind set dichotomies. I am happy to help you with plans for musical selections to try. You will need copyright releases. In our most recent research we manipulated the files with recording equipment. A second copyright permission is needed when doing that as you are not just using the song, but with today's technology, it is highly recommended to make adjustments using recordings as responses will be better.

- Research is continually being updated with technology to show what properties of music are eliciting what types of responses.

Safety Precautions for Using Music in Musical Mood Induction

Individual considerations based on potential triggers in the music related to person's background:

- **Songs**
- **Style**
- **Instruments**
- **Artists**
- **References in music which may serve as triggers**

Sleep Induction and Pain Distraction are Very Similar to Musical Mood Induction in terms of Using Music Recordings or Live Music

I have found music for sleep induction to be very successful and highly recommend Music for Dreaming by Cherie Ross out of Melbourne, Australia.

Here are samples of music that she created to be safe for use in the NICU:

Can listen to 7 examples here:

https://musicfordreaming.com/music-for-dreaming-for-baby/

This is her main website which provides more background information:

music for dreaming listening examples of safe music for NICU which can also be used for relaxation and pain distraction

Precautions Needed for Music in the NICU

- Music presented to premature babies can damage their nervous system if it is presented too soon. You need a music therapist who specializes in NICU for safety reasons to know when it is safe to introduce the music and how to introduce the music with something first that is not complex. Then over time as the neonate develops, more complex music may be safely used. Decorticate and decerebrate posturing are bad signs, not good signs for responding to the musical stimulation. You do not want to use music too early or use music that is overstimulating as it can result in harm.

More Sleep Induction Ideas Using Music

I have found music that works well for sleep induction in many styles of music as different patients prefer different styles. The properties of music are once again what are important for sleep induction.

Here is an example:

Brahms' Lullaby - cello and piano

When I used Music for Dreaming at Sacred Heart Hospital, people who were working in offices and nursing stations would fall asleep when the music was on for the patients.

I have 49 years of experience with selecting songs for sleep induction recordings with patients and am happy to help you if want to contact me.

Lullabies

- Lullabies are characterized by the descending minor third interval. All mothers across the world intuitively use this interval to put their babies to sleep and to calm them. When humming or softly singing to their babies, mothers usually also rock rhythmically. The baby is being given input to help it calm and go to sleep from the auditory and physical motor stimuli.
- This type of singing engages the vagal nerve and is related to the calming effects also noted with singing in trauma work.
- Lullabies have been effective with all populations – from youth incarcerated inside the jail who have severe complex trauma to military veterans to nursing home residents to people in addictions programs to people who are neurodiverse to people who have had head injuries, strokes, are receiving chemotherapy – no limits.

Types of Relaxation for Music Applications

Many of the choices of music for sleep induction also work for relaxation when the type of relaxation desired is physical.

Think about different types of relaxation and the type of music you would find useful for each type.

- Driving in heavy traffic – do NOT want to fall asleep, just want peace
- Mental relaxation – may need music that is energetic to distract you from emotions and thoughts that are troubling
- Emotional relaxation – may be similar to mental relaxation but may be the opposite of the need for loud, fast music to distract – may need music more similar to sleep induction music to calm emotions
- Physical relaxation after muscles are stressed from labor, sports – need music more similar to what is used for sleep induction

Musical Characteristics to Consider for Relaxation, Sleep Induction

Considerations for selecting a music segment:

- **No lyrics - only instrumental music usually works best, possibly humming for sleep induction is OK**
- **Avoid any songs on any web site that advertises music for relaxation or meditation or yoga because they induce altered states of consciousness**
- **Warning words - do NOT use any weblinks with words that describe music as being for trance, altered states, ethereal, consciousness, traveling**
- **No special effects, especially when they are claimed to be for relaxation (example: nature sounds like birds and waterfalls or the ocean, the buzzing sounds, the echo effects, white noise) - only use plain instruments with no special effects - new research indicates that white noise causes neurological damage**
- **only string instruments (piano is string instrument as it has strings) or very relaxing wind instruments - harp is ideal but choose flowing harp - sometimes plucked harp is too piercing and percussive and can trigger an increase in heart rate and blood pressure**

Musical Characteristics to Consider for Relaxation, Sleep Induction

- Low pitches, not high pitches - preferably no flute or piccolo - bass flute is OK, possibly alto flute; cello is much better than violin
- slow tempo
- rhythm should match heartbeat and be symmetrical but beat should not be felt in the body
- quiet rather than loud
- not much variation in pitch or timbre among the instruments
- flowing subdivisions are needed but it should not feel "busy"
- smooth and flowing accompaniment - should not be able to physically perceive the beat

Musical Characteristics to Consider for Relaxation, Sleep Induction

You should be able to feel that you can breathe with the music as it unfolds.

No trills, tremolos, mordents, little musical decorations with notes slid into each other

No surprises - very predictable music - "boring" to point of shutting down your brain's attention focus but subdivided beat is needed to provide flow and helps keep the negative type of boring with just a beat and no movement from creating aggravating effect

For relaxation in the brain you want the brain to go into a mode of not thinking - do not want brain to be focusing on motor or visual stimuli because they result in making the brain become alert. You want the physical relaxation to occur automatically in response to the musical stimuli - as in lullabies for sleep induction.

Music for Pain Distraction – Similar to Music for Sleep Induction/Relaxation but has Different Precautions

Pain Distraction or Physical Relaxation do not call for the same music considerations as music for emotional relaxation or for coping with stress. The first thing you need to do is to NOT think of anything that has worked to help you EMOTIONALLY relax. Totally change your mindset away from any music you personally like or have used for emotional relaxation. Think of the need for a patient in such extreme pain from muscles that are going into spasms that the patient with a cardiac risk could die from an increase in heart rate and blood pressure - which can be easily caused by lyrics or by any percussion instruments, by fluctuations in dynamic (volume) levels, by any interesting performance interpretations, by any special effects such as those used on relaxation web sites, by a pitch change in an instrument, by instruments that are not enough alike - are too different from each other in pitch or timbre, etc.

Why You Don’t Want Meditative States for Sleep Induction/Pain Distraction

We don't want a song that would be good for meditation as we do not want people to trance out - to move from alpha to a beta or theta state - we just want them to naturally calm without changing into altered states of consciousness - no sliding pitches or tones, no unpredictability as in chanting - need predictability but without feeling the beat physically in your body. The absolutely worst place to look for a song that would work is on most of the web sites advertising themselves as intended for relaxation. On brain scans they activate many parts of the brain with a lot of added in "effects" they claim will facilitate relaxation when instead they stimulate alertness in the brain. It is fine if the music puts the person to sleep but we do not want a wake state that is partially responsive. We want no stimulating activity going on in the brain - want the music interest to just fade totally down.

Some Techniques that Are Contraindicated Can Also Help Stop Muscle Spasms

- While the use of a tremolo effect or a mordent, a turn, a little decoration in the music may trigger muscle spasms, they may also help relax muscle spasms.
- The same is true for glissandos. How glissandos are performed have different effects. You may execute a glissando that ends percussively with an auditory “flick” or you may execute them to flow smoothly and end gently.
- Sometimes dotted rhythms can help break up muscle spasms.
- People with choreoathetoid tremors may entrain to the beat, so the music may make their tremors worse. Sometimes using music with offbeat accents is helpful for them, but over time their tremors can displace the beat and entrain to the offbeats.

Examples of Glissandos, Turns, Trills, Tremolos

Glissando or slide:

On this link listen to 2 seconds at the 28 and 29 second section to hear an example - Glissando or slide

Turns/grace notes

Trill - listen from 1:39 – 1:41: Trill

Tremolo

Music to Energize

- **These two songs were especially useful for the energy end of our musical mood induction dichotomy From Tired to Energized:**
- Sabre Dance- Khachaturian

- Mambo- Bernstein

Without the visual effects, the Mambo is still energizing, but the visual effects do add to the valence of the effect.

Consider need to have calm down activity before moving away to a new context after becoming highly energized. You can use music for relaxation/emotional regulation before moving into a new task/environment.

Neuroscience Explanations for Music Applications in Trauma

- Music provides direct access to the emotions and the inherent dangers of provoking and consolidating unpleasant and threatening memories. However, music also has the power to heal by helping people understand and rationalize emotions. When these ideas are expressed and shared by the client, the therapist will concentrate on encouraging the deconditioning of explicit memories while accepting that implicit memories will surface from time to time. The music therapist helps the client to understand and rationalize this.
- ACTH = Adrenocorticotropin – hormonal substance which may also be released in response to music and have a specific therapeutic action on the “damaged” amygdala
-

LDN and Music Both Have Opiate Receptor Considerations

- Fear conditioning can occur easily and suddenly, perhaps in response to a single traumatic event.
- Recovery – or deconditioning – is an active but lengthy process and may never be completely achieved
- Any process which inhibits activity in the brain, or a specific area of the brain (in this case, the amygdala) can raise the threshold for anxiety and thus reduce the likelihood of resurgence of traumatic memories.
- Drug treatment is an inhibitory mechanism. Valium has specific receptor sites in the amygdala.
- Limbic structures also contain specific opiate receptors.
- Music may stimulate the release of endorphins and similar substances which may act in the same way as exogenous drugs.

How Music is Processed in the Brain and Implications for Addictions

- The Effects of Music on the Brain

- **Music stimulates and helps produce GABA inhibitors, allowing a natural inhibition of dopamine and also allowing dopamine to be taken back up by the sending nerve cell, creating a chemical balance.**
- **Music stimulates the release of hormones and neurotransmitters via the hypothalamus (ex.: dopamine and norepinephrine) associated with appetitive stimuli and feelings of reward, which then create natural feelings of reinforcement compensating for the unnatural reinforcement produced by drug abuse.**
- **Music stimuli affect the nucleus accumbens, a region in the basal forebrain whose nerve cells act as dopamine receptors. Stimulation of this region is reinforcing and is responsible for reinforcing effects of appetitive stimuli. Music stimulates dopamine and dopaminergic producing neurons and receptor areas with impulses that are reinforcing enough to cause music to have reinforcing value.**
- **When a person with a trauma background engages in Trauma Healing work, the content that arises is often a trigger for Addictions as people try to deal with what has happened. Themes that apply to trauma usually also apply to addictions.**

CHEESLVR Goal Areas Overview for Addictions Programming with Music

- C = People with addictions often have issues with CONTROL. Music can be structured to help them learn not to assume control and manipulate through engaging them in group musical improvisational activities in which people play music together and take turns to lead and to follow the leader for how to play (example: rhythm patterns, volume, tempo, note choices to be in harmony with each other and not clash, etc.). Music can provide COMFORT for people who are struggling with addiction. Song lyrics may be used to CONFRONT people with addictions about issues that need to be explored. The group music improvisation activities may also be used to CONFRONT them as it will be noticeable if they don't follow but always try to take the lead or if they resist taking a turn to lead instead of being comfortable in both roles - leading and following a leader.
- Many people with addictions have control issues with their attempts to control people, to control their bodies, and to control their environment. Engaging them in a musical improvisation activity that requires following a leader may result in them playing more loudly, not stopping when others stop, etc. You can record the music improvisation and play it back to allow them to note their responses and to ask if those musical responses may also be reflected in their daily lives.
- H = Engagement in music can serve as a substitute HIGH for the high that is rewarding them through their engagement in their addiction.

Continuing CHEESLVR Overview of Goal Areas

- **E E = Music can also be used to help with EMOTIONAL expression and redirection and with ENERGY release. Musical mood induction is a helpful tool to use to change emotions and dance and playing percussion instruments can provide a release for the energy that builds up.**
- **S = Music may be used to provide SPIRITUAL support to help with redirecting away from the addiction and engaging in activities that represent the opposite of the addiction focus.**
- **L = Healthy use of LEISURE time is important for people with addiction. If one doesn't have any free time, that can be a trigger for stress and depression as well as for too much energy and emotion in need of being released. If one doesn't structure leisure time in a healthy way, it can feed addiction and lead to trouble.**

More CHEESLVR Goal Areas for Addictions Programming with Music

- V = Creating a relapse prevention playlist can help a person with addiction break out of the VISCIOUS cycle associated with the addiction process which is often routine and predictable. Songs that redirect away from triggers for addiction are very helpful. Humorous songs are also helpful.
- R = Using music for RELAXATION is very helpful for people with addiction.
- Music based Addictions Programs have a good track record of success.
- Compulsive Disorder philosophy - learning to stop a specific type of addiction often simply results in trading addictions - examples: a person with a compulsive disorder who learns to avoid alcohol switches to a sexual addiction, a person who learns to avoid drugs becomes addicted to exercise/becomes anorexic

How Music Can Be Applied in an Addictions Program

- Music may be used as a natural and alternative reinforcement to replace unnatural feelings of reinforcement caused by drug abuse.
- Preferred music or sedative music for relaxation may be used as an alternative reinforcement to drugs for positive expression and sensory stimulation.
- Sedative music can target over-stimulated autonomic responses such as heart beat and blood pressure.
- Songwriting and lyric analysis can target motivation and impulse control patterns to confront self deception, impulse control, and redirection of addictive thinking patterns (ex.: Johnny Cash songs: I Walk the Line, Ring of Fire, Help Me, Hurt, Folsom Prison Blues)
- Lyric analysis and song-writing may be used to target emotional dependencies, triggers, and cycles which result in drug use and in other types of addiction.

Continuing How Music Can Be Used in an Addictions Program

- **Songwriting may be used to identify appropriate coping mechanisms post treatment when re-entering society.**
- **Blues music may be used to address damaged relationships as a result of addiction.**
- **To restore motor functioning dulled by drug abuse that has affected functions of the cerebellum (governs muscle coordination), integrate balance control through gait training with music.**
- **Music may be used to stimulate cognitive processing to restore cortical networks damaged by drugs.**
- **Lyric analysis and song-writing may be used to address cause and effect stimuli and behaviors related to addiction.**
- **example:** Hurt - Johnny Cash

Examples of Addictions Programming with Music

- Singing and articulation exercises may be used to improve speech or to compensate for speech deficits related to addiction.
- Triggers - deal with how to respond to them, be prepared
- Shame/Guilt/Blame - accept responsibility and move forward, don't get stuck in shame/guilt/blame
- Bracelet Replacement song by women in jail - used analogy of the bracelet program which involves electronic monitoring after release from jail to compare their brains being on the bracelet program and needing to replace that program - idea is that they are free physically but not free with the thoughts in their head because their thoughts are keeping them trapped in a prison in their own mind - They wrote a song about needing a bracelet replacement program for the thoughts in their head.

Goal Areas for Music in Addictions Programming

- Identify triggers
- Identify usual choices of personal responses to triggers
- Identify vicious cycles related to addictions
- Develop successful tools for redirection away from vicious cycles related to addictions
- Identify alternative responses to addiction triggers that would be considered healthy and safe
- Successfully choose healthy responses to addiction triggers in the heat of the action
- Authentically participate in role play that involves choosing healthy and safe alternatives for dealing with triggers
- Develop use of music for relaxation

More Goal Areas for Music in Addictions Programming

- Develop use of music for healthy emotional expression
- Develop use of music to channel emotional expression via healthy outlets
- Develop awareness of emotions
- Develop musical repertoire of songs to use for redirection away from vicious cycles
- Develop coping skills for dealing with negative emotions
- Develop spiritual support system
- Develop insight and problem solving skills
- Broaden perspectives related to addiction

Addiction and the Brain and Music – How Addiction Works

Dopamine (neurotransmitter affecting appetitive stimuli) is released into the nucleus accumbens and other brain areas by neurons in the reward pathway. Dopamine causes us to feel good. Drugs cause dopamine to be stored in the synapses between neurons in excess amounts because drugs inhibit the re-uptake of dopamine. The neurons are then prevented from effectively communicating information for functioning via electrical signals which travel down axon pathways. The signals are disrupted from being passed from the sending neuron to a receiving neuron while other nerve cells are blocked from releasing Gamma Amino Butyric Acid (GABA), an inhibitory neurotransmitter that works to prevent the receptor nerve from being overstimulated.

Effects of Drugs on the Brain

Many drugs damage the brain by decreasing brain activity and glucose metabolism.
Drugs result in a pooling of dopamine in the synapses because they restrict GABA from inhibiting the dopamine which then creates excesses and results in a high due to the pleasure response.
The heightened pleasure creates dependency due to repeated drug use disrupting the normal balance of the brain circuits that control rewards, memory, and cognition.

Cocaine: prevents GABA inhibitors from balancing dopamine in the synapses of the brain, blocking the re-uptake of dopamine and resulting in neurons not communicating information effectively.
Cocaine use causes a decrease in glucose metabolism in the brain primarily in the frontal lobes, where planning, abstract thinking, and impulse behavior are governed. Glucose metabolism is still significantly decreased 100 days after abuse stops.

Heroine/morphine: block the release of GABA , preventing the release of dopamine from being inhibited.

Why is Music Effective for People with Addiction?

Music stimulates and helps produce GABA inhibitors, allowing a natural inhibition of dopamine and also allowing dopamine to be taken back up by the sending nerve cell, creating a chemical balance.

Music stimulates the release of hormones and neurotransmitters via the hypothalamus (ex.: dopamine and norepinephrine) associated with appetitive stimuli and feelings of reward, which then create natural feelings of reinforcement compensating for the unnatural reinforcement produced by drug abuse.

Music stimuli affect the nucleus accumbens, a region in the basal forebrain whose nerve cells act as dopamine receptors. Stimulation of this region is reinforcing and is responsible for reinforcing effects of appetitive stimuli. Music stimulates dopamine and dopaminergic producing neurons and receptor areas with impulses that are reinforcing enough to cause music to have reinforcing value.

Reasons Music is Effective

In cerebral processing of auditory stimuli, the orbitofrontal cortex (translates judgments/social situations into actions and emotional responses) exchanges information from frontal lobe structures with the limbic system (emotional function center), the cingulated gyrus (emotions, motivated behavior), and the amygdala (responds to aversive stimuli, deals with anger and fear associated with defensive, offensive, and escape behaviors).

All of these structures respond to music stimuli which can affect emotional triggers in addiction.

The normal neuronal pathway for sound sensation allows music to have an effect on structures of the brain which are most responsible for emotional behavior (hypothalamus and limbic system), inhibiting negative emotional reactions which would otherwise delay or interfere with treatment and recovery.

Reward Pathway

neuron pathway release neurotransmitter dopamine into
nucleus accumbens
& other brain areas
axon releases
dopamine which is released
into synapse
GABA = inhibitory neurotransmitter
Is blocked by drugs – drugs keep GABA from doing its job
Drugs inhibit dopamine reuptake so that too much dopamine is in the synapse.
The person experiences a high from the overstimulation.
re-uptake – absorption process through which neurotransmitters are absorbed after causing the receiving neuron to fire or preventing it from firing

How Addiction Works

- Dopamine released into nucleus accumbens/other brain areas by neurons in reward pathway
- Drugs cause dopamine to be stored in synapses between neurons in excess amounts
- Neurons then prevented from effectively communicating info for functioning via electrical signals which travel down axon pathways
- Signals are disrupted from being passed form the sending neuron to a receiving neuron while other nerve cells are blocked from releasing GABA

Effects of Some Drugs on the Brain

- result in a pooling of dopamine in the synapses because they restrict GABA from inhibiting dopamine then creating excesses and results in high due to pleasure response
- heightened pleasure creates dependency due to repeated drug use disrupting normal balance of the brain circuits that control rewards, memory, cognition
- cocaine:
- prevents GABA inhibitors from balancing dopamine in the synapses of the brain, blocking the re-uptake of dopamine and resulting in neurons not communicating info effectively
- cases decrease in glucose metabolism in frontal lobes (planning, abstract thinking, impulse behavior), glucose metabolism still significantly decreased after abuse stops
- heroin/morphine
- blocks release of GABA, preventing release of dopamine from being inhibited

Why Is Music Effective for People with Addiction?

- stimulates GABA inhibitors, allowing natural inhibition of dopamine and for it to be taken back up by the sending nerve cell creating a chemical balance
- stimulates the release of hormones and neurotransmitters via the hypothalamus associated with appetitive stimuli and feelings of reward, then creates natural feelings of reinforcement compensating for unnatural reinforcement produced by drug abuse
- affect the nucleus accumbens, a region in the basal forebrain whose nerve cells act as dopamine receptors. Stimulation of this region is reinforcing and is responsible for reinforcing effects of appetitive stimuli. Music stimulates dopamine and dopaminergic producing neurons and receptor areas with impulses that are reinforcing enough to cause music to have reinforcing value.
- Cerebral processing of auditory stimuli- orbitofrontal cortex exchanges info from frontal lobe to limbic system, cingulated gyrus, and the amygdala- all respond to music which can affect emotional triggers in addiction
- Normal neuronal pathway for sound sensation allows music to influence structures of brain which are responsible for emotional behavior, inhibiting negative emotional reactions which would delay treatment/recovery

Music and Biochemical Respondents

- When musical impulses are transmitted through the brain in hololological fashion, activate release of transmitter substances with each synaptic leap
- Transmitter substances (neurotransmitters), neuromodulators, hormones, pheromones control behavior of individual cells, organ systems, or entire organism
- When neuron fires, sends electrical signal, and causes release of neurotransmitter
- Neurotransmitter released by neuron, must be detected by protein to have an effect
- Neuromodulators released similarly but in great enough amounts to travel further- modulate activity of many neurons in particular part of brain
- Pheromones released into environment through sweat, urine, specialized glands

Hormones Released through Endocrine Glands and Travel through Bloodstream

- Influence behavior by stimulating receptors in certain cells, changing activity level
- Two types of hormones- peptides and steroids
- Peptides- chains of amino acids- may function as neurotransmitters or neuromodulators, effect on pain sensitivity
- Endorphins- reduce pain awareness by stimulating specialized receptors
- Some regulate defense behaviors along with eating/drinking
- Steroids- travel to cell nuclei and alter protein production

Neurotransmitter A C h (acetylcholine) released at synapses on skeletal muscles

- On skeletal muscles- produce depolarizations, enhance excitation of muscle fiber
- On cardiac muscles- produce hyperpolarization which inhibits muscle potential

Monoamine subcategory of catecholamines

- Epinephrine- adrenalin, secreted by adrenal medulla
- Norepinephrine- noradrenalin, helps control alertness/wakefulness, excitatory effects on targets in sympathetic nervous system
- Dopamine- either excitatory or inhibitory effect on post synaptic potentials
- Associated w/ functions like movement, attention, learning, addiction
- Drugs that inhibit dopaminergic neurons alleviate schizophrenic symptoms
- Breakdowns of dopamine produce melanin
- Serotonin- produces inhibitory postsynaptic potentials, plays role in mood, eating, sleep, arousal, pain regulation
- Amino acids- secreted directly as transmitter substances, raise or lower thresholds for excitation of action potentials

Singing is Restorative for Trauma Work

- Singing is restorative: physiologically facilitates deep breathing which slows the heart rate and calms the nervous system, stilling the mind and body and resulting in relaxation
- Reciprocity between physiological effects and psychological effects of breathing – By restricting the intake and release of breath we can control our feelings. How we breathe affects how we feel and how we feel affects how we breathe. When a client holds breath after revealing an emotionally charged issue and Austin encourages person to exhale fully, person often comes into contact with a feeling that person had been suppressing. Austin suggests that "singing can enable the traumatized client to reconnect with her essential nature by providing her with access to, and an outlet for, intense feelings. Singing offers a way the painful feelings to be put into an aesthetically pleasing form. " One client said: "When I sang just now, I took something ugly that happened to me and made it beautiful."
- p. 236"The act of singing is empowering: sensing the life force flowing through the body; feeling one's strength in the ability to produce strong and prolonged tones; experiencing one's creativity in the process of making something beautiful; having the ability to move oneself and others; and hearing one's own voice mirroring back the undeniable confirmation of existence. Owning one's voice is owning one's authority and ending a cycle of victimization."
-

Therapeutic Benefits of Singing

- Engagement of neurochemical systems responsible for reward, motivation, pleasure, stress/arousal, immunity, and social affiliation
- Help improve psychological health and wellbeing
- Listening to preferred music stimulates the release of Dopamine
- Increase levels of immunoglobulin A
- Decrease levels of stress, decrease corticoids, cortisol
- Increases level of oxytocin promoting social affiliation and bonding
- Modify and regulate automatic systems such as heart rate, respiration rate, perspiration and other automatic systems
- Helps regulate speech when stimulating musculature
- Facilitate relaxation
- Helps traumatized clients reconnect with their essential natures by giving an outlet for their intense feelings

Some Responses to Use of Music in Trauma Work

- Response to music – perception and processing and a series of complex sound waves with powerful emotional overtones
- Performance is accompanied by movement and body language.
- VAT = vibro-acoustic therapy – uses pulsed frequencies of a very low order as well as musical vibrations
- – suggests physical effect of vibration on the nervous system may contribute to the therapeutic potential of music

- Music involvement offers a process of converting negative feelings into positive benefits.

International Perspectives on Music Therapy in Trauma – Music, Music Therapy and Trauma - Jessica Kingsley Publishers

- Pavlicevic suggests that by focusing therapeutic work exclusively on children's trauma we risk fitting a multidimensional, complex child into a small space – called the traumatized child. She suggests the Nordoff-Robbins approach with recognition of the Music Child.
- Grenadier questions professionals' apparent need to elicit trauma, often encouraging patients to remember and uncover traumatic incidents. She suggests that doing so encourages patients to remain victims or survivors of violence and abuse.
- In South Africa mothers were able to see their children as more than just traumatized children after observing them in creative music therapy sessions. throughout text in case studies: music provides a containing structure for the expression.

More International Perspectives on Trauma and Music from book published by Kingsley – edited by Julie Sutton

- p. 76 – 77 Kostelny told Cambodian refugees to get positive revenge = refusal to let the perpetrator win by recovering and moving on in life in a positive direction
- p. 130 Denying and destroying a person's humanity is a primary aim of torture.
- p. 77 Adaptation and problem solving to find solutions to new problems relies on creativity.
- Turner, McFarlane, and van der Kolk point out that traumatization may lead to problems in tolerating intimacy, the impulse to avoid the suffering caused by the traumatic situation, and shame and guilt, all of which are factors that may impede therapeutic engagement. The sense of alienation and being misunderstood that can result from traumatization may be a further barrier to seeking help.
- p. 78 Music is not neutral in political wars. It becomes associated with one side or another. Even playing a specific instrument may be associated with one side of the conflict.

And More International Perspectives on Trauma and Music

- p. 172 aggressive behavior may be form of limit testing to see how safe the music therapy environment is
- p. 173 need to prepare for endings - many sudden losses had been endured
- primary request of local people was to attend concerts – may help feel sense of community and celebration of survival
- p. 223 Clients often present: wall of sound – continuous and very loud playing
- extreme difficulty in tolerating quietness or silence
- difficulty staying in the room
- dissociation
- acting out the invader or invading army

Music and Memory

Scroll down to view the links below:

- Henry with the iPods Music and Memory Project
- This Is Love Gladys and Naomi
- Oliver Sacks - Musicophilia - The Power of Music

Music and Palliative Care/Hospice

Legacy Recordings:

- Heart Beat Song - Composing Healing Music from Heartbeats

Music is helpful in preparing for death experience – for patients and for significant others. Music helps them continue to live and not focus on death and can also be used to prepare for death and face it. Patients can help plan music for their funeral/memorial service/celebration or life, can make recordings (including of themselves) to be played at funeral or for special people afterward, for burial services, for the death experience. Music can help decrease choking/struggling for breath via rhythmic entrainment if pulmonary issues become exacerbated during death process. Music can help deal with and still connect in with areas of loss in pie of life. Music can help the grief process be productive rather than destructive.

Parkinson’s Disease and Music

Use of Music for Gait -

Gait Training for Parkinson's patient using Music

Cueing Gait through Music for Parkinson's Disease

idea of using music came from RAS (Rhythmic Auditory Stimulation), a Neurologic Music Therapy technique :

Neurologic Music Therapy - Rhythmic Auditory Stimulation - Gait Training

Dr. Michael Thaut found that the biceps and triceps move simultaneously in the presence of an equally spaced auditory rhythmic stimulus but moved slightly apart and not simultaneously when the equally spaced auditory rhythmic stimulus was not present. He applied the synchronicity cue for movement to gait training for patients with Parkinson’s Disease and ultimately developed an entire set of music therapy techniques and model of practice called Neurologic Music Therapy.

More Music Applications for Parkinson's Disease

- Improve vocal volume and clarity of speech through singing and playing wind instruments
- Improve motor strength and control/coordination through playing instruments – similar to boxing, playing drums can include wearing weights to strike the percussion instruments in specific ways for strengthening, stretching, coordination
- Use rhythmic cueing to remediate festination
- Use musical mood induction to reverse depression
- Join a music ensemble to decrease loneliness
- Learn a new instrument or practice playing an instrument to maintain/improve memory and develop emotional expression

More Examples of Music Applications for People with Diagnoses Served by LDN

- Psychosis and Dissociative Disorders – here and now involvement with music engagement – singing, playing instruments, dancing
- Labor and Delivery – music to focus off pain and on music, as a structural aid for breathing, stimulus for pleasure, and stimulus for relaxation after training
- Chronic pain - music for distraction, when using specific relaxation training can become learned association – Alexander technique especially helpful
- ADHD – body percussion, dance, playing instruments, singing to focus, increase organization and target executive functions

Music and Autism Spectrum

- Rhythm is an amazing neurological organizer
- Emotional Regulation is a primary goal area
- Communication using music bridges a divide in their world so they are not as separated from others in many arenas
- Emotional awareness can be targeted using music
- Emotional congruence between feelings and expression is very successful when using the Nordoff-Robbins technique
- Emotional Expression can be facilitated via safe/healthy outlets in socially acceptable ways
- Music is often especially motivating and pleasing for them

Feel Free to Contact Me for More Detailed Information

- I am happy to share resources over e-mail. If you want more information on a given topic, e-mail me at rasarla@uwec.edu

- I highly recommend Dr. John Schaman as a speaker for you on using harmonicas for health purposes
- and Cherie Ross (with Music for Dreaming) as a speaker for you on using music in a safe/healthy way for relaxation or sleep induction.

Thank you for the opportunity to share about music and music therapy!

Lee Anna