MUSIC T.I.D.: EFFECTIVE PRESCRIBING PRACTICES FOR THE GERIATRIC PATIENT

Emma Bjore, MD
Geriatric Fellow
Division of Geriatric Medicine
University of Colorado SOM
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DISCLOSURES

• No financial disclosures
OBJECTIVES

• Present a basic understanding of music’s impact on neurobiology and neurochemistry.

• Describe the preventative and therapeutic potential of music when applied to the geriatric population.

• Evaluate options for integrating music into geriatric practice.

OUTLINE

• History of therapeutic value of music
• Neurobiology (anatomy) of music
• Neurochemistry of music
• Music utilization
  • Preventative medicine/wellness
  • Pain
  • Dementia
  • Parkinson’s
  • Stroke
  • ICU
  • Palliative care
  • Caregivers
• Community resources
WHY?

- What are our values as providers and team members who care for the geriatric population?
HISTORY OF THERAPEUTIC VALUE OF MUSIC

• Neanderthals
  • First flute 35,000-40,000 years old
  • Music use in daily life
• Pythagoras
  • 6th century BC used music to treat bodily and psychiatric illnesses
• Hippocrates
  • 400 BC - played music for his patients!
• Plato
  • Music therapy “attuning the soul to the cosmos”
HISTORY OF THERAPEUTIC VALUE OF MUSIC

• Music Therapy- the clinical and evidence-based use of music interventions to accomplish individualized goals within a therapeutic relationship by a credentialed professional who has completed an approved music therapy program

  • 1940s-clinical organization began
  • 1980s-MT-BC
  • 1990s-has been a reimbursable therapy under Medicare PHP

HISTORY OF THERAPEUTIC VALUE OF MUSIC

• Music Thanatology - a professional field within the broader sub-specialty of palliative care.

  • unites music and medicine in end of life care.
  • utilizes harp and voice at the bedside to lovingly serve the physical, emotional and spiritual needs of the dying and their loved ones with prescriptive music
  • 2004-standards set by MTAI, independent certifying body, CM-Th
• Elements of Music:
  • Melody-pitch, theme...
  • Harmony-chord, progression...
  • Dynamics-piano, forte...
  • Rhythm-beat, meter, tempo...
  • Tone-register, range, instrumentation...

• Where is music perceived and processed?
  • A. The auditory cortex
  • B. The motor cortex
  • C. The prefrontal cortex
  • D. The nucleus accumbens and the amygdala
  • E. The hippocampus
  • F. The cerebellum
  • G. The corpus callosum
WHAT IS THIS?
WHY IS IT IMPORTANT?

- https://voices.no/index.php/voices/article/viewFile/872/720/3906
NEUROBIOLOGY OF MUSIC

Sentence Generation and Melody Generation

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z = 58  z = 42  z = 16  z = 6  z = -6  z = -22
Figure 3. Visualization of neuroimaging results.

http://journals.plos.org/plosone/article?id=10.1371/journal.pone.0088665

NEUROBIOLOGY OF MUSIC

- Music is processed in several areas of the brain and BILATERAL
- PET scan activity increased when:
  - Preferred music vs neutral music
  - Pleasant music vs rest
  - Singing vs speaking
FMRI DEMENTIA

- Patients with AD have greater activation on fMRI with familiar music than unfamiliar.
- Control patients showed the opposite (pay more attention to novel music).

NEUROCHEMISTRY OF MUSIC

- Dopamine and endogenous opioids - reward, motivation, pain relief, mood.
- Cortisol modulation - stress, mood.
- Oxytocin - bonding, organize social behavior, decrease stress/anxiety.
- Brain stem-autonomic regulation HR, BP, RR, sensory/motor function mediation.
  - Norepinephrine/epinephrine and serotonin.
NEUROCHEMISTRY OF MUSIC

- Potential for improved immune function:
  - Increases in total number of lymphocytes (NK cells), T cells, CD4 cells, IL-6
  - Salivary IgA—music associated with increase as opposed to resting state, increased even greater in group singing exercises

- BDNF—neurogenesis and structural plasticity
  - Increase in patients with MCI after listening to classical music
BRAIN PLASTICITY

- Brain is plastic throughout life
- TBI/stroke
- Juggling study-20yo and 60yo, 3mths daily juggling, increase in the gray matter volume in midtemporal area (resolution after 3mths of not juggling)
- Plasticity does decrease with age

PREVENTATIVE RX

- Aging causes decreased level of function in perception, motor control, memory and elements of cognition
- Piano lessons:
  - Improvement in working memory, perceptual speed and motor skills
  - Gray matter increases: midtemporal, hippocampus, nucleus accumbens
PREVENTION RX

- Musically trained individuals
  - Increase in gray matter volume in the left inferior frontal gyrus
  - Preservation in total brain volumes, dorsolateral prefrontal cortex, left inferior frontal gyrus

PREVENTION RX

- Longitudinal study
  - Aged over 75yo
  - Followed 5 years

- Those who frequently played a musical instrument were less likely to develop dementia
PREVENTION/WELLNESS RX

• Chorale program
  • 64 and older
  • Improved overall health rating
  • Decrease in number of OTC medications
  • Decrease in falls

WELLNESS RX

• Anxiety-preop study benzo vs music
  • Music decreased anxiety (state trait anxiety index), HR more
  • Benzo decreased SBP more
WELLNESS RX

- Nursing home in Norway (n=84) had regular music therapy programing...until one day they didn’t...

- Statistically significant decrease in depression with music therapy

PAIN RX

- Neuropathic pain
- Post op pain (cardiac to dental)
- Chronic nonmalignant pain
- Thermal pain
- Gait control theory of pain
DEMENTIA RX

- Behavioral and psychological sx
  - Improvement with singing and music listening
  - Less agitation, loss of interest, lack of energy, anxiety
  - Improved self esteem

- Cognitive
  - Improvement in speech content and fluency on spontaneous speech
  - More stability in decline

- Wellness
  - Decrease in NPI music therapy vs recreation
  - Caregivers
DEMENTIA RX

- Henry from Alive Inside documentary
- https://www.youtube.com/watch?v=QG7X-cy9iqA

DEMENTIA RX

- Review by Italian Psychogeriatric Association:
  - 32 RCT or Clinical Controlled Trials
    - 20 studies behavioral/psych sx-reductions in anxiety, physical/verbal aggression, delusions, apathy, sleep disorders, improved social behaviors
    - 6 studies cognitive fcn-did show improvement
DEMENTIA RX

- Behavioral-Nursing Homes
  - Relaxing music played during meal times
  - MMSE 0-17 (median of 3)
  - 30 subjects, 2 LTC
  - 4 weeks-introduction, removed
  - Total agitated behaviors decreased

- Anxiety-Nursing Homes
  - Preferred music listening reduced anxiety

DEMENTIA RX

- Long term effects:
  - Weekly group MT-2 years
  - improved BP
  - memory testing stable vs control decline
PARKINSON’S RX

- Motor and emotional rehabilitation
- Physical therapy vs. Music therapy
  - Significant improvement especially in bradykinesia in MT group
  - Rigidity improved more with PT
  - ADL total score-MT benefit significant on cutting food, dressing, falling, freezing
  - Happiness markedly improved in MT
  - QOL improvement-both groups

- Benefits not seen at two month post study

STROKE RX

- Daily music listening vs audio book vs control
- s/p acute MCA stroke
- Gray matter volume and reorganization greatest in music listening
ICU-MECHANICAL VENTILATION RX

- Meta analysis-14 trials
  - Music listening has a statistically significant reduction in anxiety in mechanically ventilated patients

- Reduced SBP, RR consistently

- One larger study-reduction in sedative and analgesic intake in music group, two other studies report trends towards this

PALLIATIVE CARE RX

- Palliative care- multidisciplinary approach to providing relief from suffering (emotional, physical, mental, spiritual) and symptoms improving quality of life in patients with life limiting illnesses and their families

- RCT-200 inpatients, standard vs standard with MT
  - Significant decline in the functional pain score with MT
  - Greater decline in numeric pain rating scale in MT
  - Face, Legs, Activity, Cry, Consolability Scale (FLACC) scores declined significantly in both groups
PALLIATIVE CARE RX

• Entrainment—echoes pain/emotion with musical representation then leads into a place of relief

• Singing familiar vs composition

• Listening

• Imagery

PALLIATIVE CARE RX

• Hospice

• Review of 11 studies—statistically significant improvement of sx and QoL
CAREGIVERS RX

- Empowerment and self care
- Preloss music therapy
- Small qualitative study of caregivers who suffered recent loss
  - Believed music enhanced their loved ones lives
  - Supported their own grief expression
  - Promoted connection with the deceased
  - Helped experience enjoyment

CAREGIVERS RX

- Dementia-AMT 12 sessions 40min twice weekly
  - Promote communication
  - Strengthen relationship
  - Decreased anxiety and burden
  - Family view as important support in management of behavioral and communication disturbances
COMMUNITY RESOURCES

- Senior Blue Book
- Highlands Ranch Encore Chorale- 55+
- Swallow Hill Music-cello, guitar, banjo, harp, singing
- Broadway Music School-banjo, mandolin, piano, drums, flute, clarinet, singing
- Denver Music Institute-free trial lesson! Many instruments
- Forte Academy of Music- curriculum designed specifically for adults, classes, informal wine and cheese get-togethers

COMMUNITY RESOURCES

- International Association for Music and Medicine-publishes quarterly peer reviewed academic journal “Music and Medicine”
- Denver Music Therapy-
  - Colorado Association for Music Therapy → Find a Therapist
TAKE HOME MESSAGE

• Music needs to be part of the first line therapies

• Through the complex neurobiological and chemical systems which music influences, we have recognized many benefits for the geriatric population

• Music can be utilized in a wide range of conditions, from disease prevention to wellness promotion in chronic illness

TAKE HOME MESSAGE

• Did you think about how you can incorporate the therapeutics of music into your practice?

  • Clinic, Hospital Wards to ICU, Nursing Home, Personal Homes, Inpatient Hospice
  • Well older adults, those with pain, dementia, Parkinson’s, acute brain injury-stroke, depression/anxiety, chronic disease, death and dying…
  • Caregivers
  • Yourself
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- Division of Geriatrics
- The VA

REFERENCES

REFERENCES

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- www.mtai.org
- http://www.musictherapy.org
THANK YOU!
QUESTIONS OR COMMENTS?