Objectives

Understand the differences between music therapy, NICU-music therapy, and music-medicine

Describe how music therapy enhances the neurodevelopment of neonates and contributes to family-centered care in the NICU

List two ideas for collaboration with music therapy in your NICU

What is Music Therapy?

American Music Therapy Association

“Music Therapy is 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”

Music Therapy is...

- A profession
- Research-based
- Practiced at bachelor, master, and doctorate levels
- Therapy

Music Therapy is not...

- An intervention
- Complimentary and alternative
- Provided by volunteers
- Entertainment
What is NICU-Music Therapy?

**National Institute for Infant & Child Medical Music Therapy**

NICU-Music Therapy (NICU-MT) is the provision of evidence-based music interventions by a music therapist in the NICU to address neurodevelopmental and psychosocial clinical goals for premature and full-term infants admitted (or once admitted) to the NICU.¹

<table>
<thead>
<tr>
<th>Training</th>
<th>Research</th>
<th>Clinical Practice</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Clinical Fieldwork&lt;br&gt;• Lecture Series&lt;br&gt;• 2 Board Exams&lt;br&gt;• RCTs&lt;br&gt;• Meta-analyses&lt;br&gt;• Neurodevelopmental Stimulation&lt;br&gt;• Pacifier Activated Lullaby System (PALS)&lt;br&gt;• Psychoeducation</td>
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</table>

What is Music-Medicine?

**Cochrane Reviews**

“It is important to make a clear distinction between music interventions administered by medical or healthcare professionals (music medicine) and those implemented by trained music therapists (music therapy)” (Bradt et al., 2016)

**Music therapy or music-medicine?**

• Is there a music therapist (MT-BC) involved?
• What is the rigor of scientific evidence?
• Does the intervention involve therapeutic relationship?
• Are there specific, measurable, and individualized clinical goals?
1. Multimodal Neurodevelopmental Stimulation

Protocol: Systematic use of auditory input (singing and guitar), touch, and vestibular input as infant tolerates

Goals: Increase toleration to stimulation; develop habituation to input

Subjects
- N=108
- 32-36 weeks postmenstrual age (PMA) and at least 10 days old
- <2500 g at birth

(Walworth et al, 2012)

2. Multimodal Neurodevelopmental Stimulation Education

Protocol: Caregiver education on systematic use of auditory input (singing/humming), touch, and vestibular input as infant tolerates

Goals: Increase toleration to stimulation; develop habituation to input; improve caregiver-infant bonding

Subjects
- N=20
- <37 weeks PMA
- <2500 g at birth

(Whipple, 2000)

3. Pacifier Activated Lullaby System (PALS)

Protocol: Reinforce non-nutritive sucking via device that rewards suck bursts and suck pressure with recorded sung music

Goals: Teach sucking/feeding behaviors; moderate sucking endurance and strength

Subjects
- N=94
- 34-35 weeks PMA
- Taking < 5 of oral feed

(Chorna et al, 2014)
NICU-MT Research and Intervention

4. Contingent Singing

Protocol: Live sung and/or guitar and sung music provided as tolerated contingent on neonate behaviors

Goals: Promote relaxation; teach self-regulation skills; reduce irritability; improve sleep

Subjects

- N=66
- Full-term; healthy

Mean and standard deviations for crying time in minutes by group:

<table>
<thead>
<tr>
<th></th>
<th>Experimental</th>
<th>Control</th>
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</thead>
<tbody>
<tr>
<td>Week 1</td>
<td>23.47</td>
<td>31.25</td>
</tr>
<tr>
<td>Week 2</td>
<td>24.14</td>
<td>32.28</td>
</tr>
<tr>
<td>Week 3</td>
<td>31.28</td>
<td>41.26</td>
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<tr>
<td>Week 4</td>
<td>34.76</td>
<td>52.01</td>
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<tr>
<td>Week 5</td>
<td>26.76</td>
<td>43.17</td>
</tr>
<tr>
<td>Week 6</td>
<td>22.92</td>
<td>41.12</td>
</tr>
</tbody>
</table>

Means for parent-infant interaction behaviors by group:

<table>
<thead>
<tr>
<th></th>
<th>Experimental</th>
<th>Control</th>
</tr>
</thead>
<tbody>
<tr>
<td>Look</td>
<td>3.66 (0.60)</td>
<td>2.25 (2.75)</td>
</tr>
<tr>
<td>Talk</td>
<td>10.57 (1.51)</td>
<td>6.17 (5.46)</td>
</tr>
<tr>
<td>Stare</td>
<td>6.90 (3.23)</td>
<td>1.57 (1.68)</td>
</tr>
<tr>
<td>Sing</td>
<td>0.90 (0.90)</td>
<td>0.40 (0.40)</td>
</tr>
<tr>
<td>Infant-Response</td>
<td>3.80 (2.82)</td>
<td>1.80 (2.86)</td>
</tr>
</tbody>
</table>

NICU-MT Research and Intervention

5. Music-Based Play

Protocol: Responsive sung music in conjunction with musical toy play

Goals: Promote fine and gross motor skills; promote auditory discrimination and localization skills; promote positive socialization; promote language development

Subjects

- N=24
- 44-66 weeks PMA

Results:

- Same degree of motor skill acquisition for both groups after four weeks
- Significant increase in gross and fine motor, cognitive, social/emotional, and communication domains
- Parent mentoring improved outcomes
A Review of the Literature

NICU-MT Meta-Analyses

Standley, 2012 (30 studies; 1,725 subjects):
- Recorded music (including mother singing and heartbeat sounds) facilitated by MT has positive effects on HR, behavior state, and O2 Saturation
- Neurodevelopmental stimulation has positive effects on LOS
- PALS Tx has significant impact on sucking/feeding ability

Bieleninik et al., 2016 (14 studies; 1,230 subjects):
- Recorded maternal singing and live caregiver singing and contingent singing by MT has positive effect on respiratory rate and decreases behavioral distress
- Mother inclusion in MT decreases maternal anxiety

NICU-MT Recommendations

Populations and Ages
- Premature 28-36 weeks PMA and <2500 g for Neurodevelopmental Stimulation
- >34 weeks PMA and poor nipple feeding for PALS
- Maintain volume (loudness) below 65-75 dB Scale-C
- Inclusion of caregiver voice (especially mother voice) as much as possible; integrate Caregiver Psychoeducation
- 2-4x week 20-30 minute Music-Based Play session for infants >40 weeks
- Contingent Singing and PALS for NAS and Neuro-irritability

Upcoming Research and Practice

Recorded Caregiver Voice Interventions
- Recorded maternal voice and heartbeat sounds for pacification and analgesia
- Procedural support applications
- Nursing collaboration

Recorded Heartbeat Interventions
- Legacy-building
- Caregiver-infant bonding
- Procedural support applications
Current NICU-MT Research at Orlando Health

Recorded maternal voice and heartbeat sounds
- 5 minute recording provided for premature infants after Retinopathy of Prematurity (ROP) Eye Exam
- Compared to standard comfort care for procedure
- Pain measured at baseline, during eye exam, 1 minute after exam, and 5 minutes after eye exam

Subjects
- 31-36 week PMA
- <2500 g
- Open crib
- ROP exam

Outcomes
- Premature Infant Pain Profile (PIPP)
- Length of eye exam
- Parent involvement

Preliminary Results

<table>
<thead>
<tr>
<th></th>
<th>Baseline</th>
<th>Eye Exam</th>
<th>Post 1</th>
<th>Post 2</th>
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<tbody>
<tr>
<td>PIPP</td>
<td>3.9</td>
<td>10.7</td>
<td>6.6</td>
<td>4.9</td>
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<tr>
<td></td>
<td>4</td>
<td>10.7</td>
<td>5.9</td>
<td>3.9</td>
</tr>
</tbody>
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Repeated Measure

Collaboration

Common Collaboration Methods
- Consulting with nurses
  - Recorded music regimens and music advice
  - Feeding
  - Developmental milestones
- Co-treatment with rehabilitation specialists
  - Developmental milestones
  - Feeding
  - Entrainment exercises
- Collaboration with Chaplains
  - Spiritual bonding
  - Ceremonial music enhancement
  - End-of-life music thanatological work
Collaboration

Who should collaborate with NICU music therapists?

EVERYONE

Conclusions

NICU-Music Therapy as a Staple of NICU Care

• NICU Music Therapists have expertise in auditory development and auditory protection of the preterm infant
• NICU-MT contributes intuitively to family-centered care
• NICU-MT is conducive to collaboration and targets many neurodevelopment and psychosocial goals

Something to keep in mind

• Evidence-based practice is a process
• Music therapy is multifunctional
• Evidence is important, and there is always more research to be done
• Safety requires knowledge and training

Resources

Music Therapy with Premature Infants: Research and Developmental Interventions (Standley & Walworth, 2010)

Guidelines for Music Therapy Practice in Pediatric Care (Ed. J. Bradt, 2013)

Www.musictherapy.org

References


