R.E.S.T. MORE THAN RESTING FOR INDIVIDUALS WITH BRAIN INJURY

Christina Dellibovi, MS, CCLS, CBIS
Sue Fowler, PhD, RN, CNRN, FAHA
Children’s Specialized Hospital
October 2015
Objectives

• Define R.E.S.T.
• Discuss strategies to implement R.E.S.T. concepts across the continuum of care (considering appropriate individuals/patients).
• Describe outcomes related to R.E.S.T. interventions.
R.E.S.T.

- Restful Recovery
  - Ample rest for natural recovery
- Emphasis on Education
  - Family education
- Sensory Stimulation
  - Exposure within a controlled environment
- Therapeutic Interventions
  - Individual therapy needs
R.E.S.T Across the Continuum of Care

- Acute Care
  - Critical Care
  - Medical-surgical
- Rehabilitation
  - Inpatient
  - Outpatient
- Long-term Care
- Community
  - School/community
  - Respite/hospice
Patient Population

• Acquired Brain Injury
  • Damage to the brain, which occurs after birth and is not related to a congenital or a degenerative disease. These impairments may be temporary or permanent and cause partial or functional disability or psychosocial maladjustment.
    • World Health Organization, 1996

• Traumatic Brain Injury
  • <6 months post injury

• Anoxic Brain Injury
  • <3 months post injury

• Exclusion Criteria
  • Viral/bacterial origin
  • Significant premorbid delay prior to onset of present condition

• RLAS I-III (or similar level of function/arousal)
Rancho Los Amigos
Levels of Cognitive Functioning

- RLAS I: No Response
  - Patient is unresponsive to any stimuli presented
- RLAS II: Generalized Response
  - Patient reacts inconsistently and non-purposefully to stimuli in non-specific manner
  - Responses are often the same regardless of type of stimulus presented
- RLAS III: Localized Response
  - Patient reacts specifically but inconsistently to stimuli
  - Patient response is related to type of stimulus presented
  - Initiation of command following

- RLAS IV-X ....
Alternative Terms

• What is Coma?
  • A coma, sometimes also called persistent vegetative state, is a profound or deep state of unconsciousness. Persistent vegetative state is not brain-death.
  • Individuals in such a state have lost their thinking abilities and awareness of their surroundings, but retain non-cognitive function and normal sleep patterns. Even though those in a persistent vegetative state lose their higher brain functions, other key functions such as breathing and circulation remain relatively intact. Spontaneous movements may occur, and the eyes may open in response to external stimuli. Although individuals in a persistent vegetative state may appear somewhat normal, they do not speak and they are unable to respond to commands.
    • http://www.ninds.nih.gov/disorders/coma/coma.htm
Alternative Terms

- The *minimally conscious state (MCS)* is a condition of severely altered consciousness in which minimal but definite behavioral evidence of self or environmental awareness is demonstrated.

- Patient demonstrates on a reproducible or sustained basis by one or more of the following behaviors:
  - Following simple commands.
  - Gestural or verbal yes/no responses (regardless of accuracy).
  - Intelligible verbalization.
  - Purposeful behavior, including movements or affective behaviors that occur in contingent relation to relevant environmental stimuli and are not due to reflexive activity.

http://www.neurology.org/content/58/3/349.full
Review of the Literature
Review #1

  - Evidence suggests that performance of neurons is directly proportional to environmental stimulation.
  - Authors stats that although children are not responding to stimuli they may have an awareness of the stimuli provided.
  - Findings: The Glasgow Coma Scale (GCS) showed significant improvement after 2 weeks of stimulation therapy in study group while in control group GCS score remained almost unchanged with no significant improvement.
    - Study group showed significant improvement in level of consciousness after 2 weeks of stimulation while in control group no change was noted.

  - Purpose was to explore the available research studies regarding "sensory stimulation programs" and traumatic brain injury and to determine whether evidence supports the use of an SSP practice. The 2nd objective was to provide practitioners with practical guidelines to use when developing and implementing an SSP with appropriate clientele. The 3rd objective was to provide examples of SSP use in practice.

  - Analysis found increased cognition, arousal, and functional independence; decreased heart rate, motor tone; and, no negative physiological effects.
Review #3


- The authors critically reviewed literature on intensive multisensory programs, coma recovery programs, coma arousal therapy, and sensory regulation programs for individuals in PVS.
- It was noted that some programs believe patients are living in a state of sensory deprivation while others feel they are experiencing over-stimulation; both viewpoints try to regulate stimulation.
- Evidence suggests the use of meaningful and/or pleasant stimuli to create positive emotions in order to enhance the ability to communicate and engage with the environment.
- Findings emphasize that patient behavior can be positively influenced by controlling or structuring the environment.
- It may be more important to present an environment where patients can process stimuli rather than concentrate on amount or intensity.
Evidence to Practice

• What is the intervention associated with R.E.S.T? It…
  • Consists of structured stimulation that is meaningful to patient.
  • Is provided at varying intervals throughout day.
  • Takes into account periods of rest breaks .
  • Balances intervention and rest.
  • Aims to increase recovery speed and arousal.
Evidence to Practice

• Highest Level of Evidence Published
Bottom Line

• There is a lack of randomized controlled studies.
• Researchers cannot control for spontaneous regeneration following brain injury, therefore, it is not possible to determine whether natural brain recovery or sensory stimulation is the reason for physiological and behavioral changes.
• Family participation is important.
• Meaningful items should be included for sensory stimulation.
• Treatment duration varies.
• It is highly important to regulate environment/decrease stimulation.
• Remove all stimulation if s/s of distress observed.
Strategy: Establish Protocol Goals

• Consistent and appropriate presentation of multi-sensory stimulation to increase arousal and enhance patients’ responses with environment.
• Interdisciplinary team offers continuity of care across medical, nursing, therapies, support staff, and families.
• Provide an environment that optimizes child’s responsiveness.
• Education family regarding coma recovery, neurofatigue, and sensory stimulation.
R: Rationale for Restful Recovery

- Brain healing is a natural process with or without therapy. It needs rest to rebuild neuronal connections.
- As important, if not more important, than other interventions, quiet rest and recovery time should be built into each patient’s day.
Strategy: Scheduling and Room Assignment

- Schedules created to include therapies, rest, nursing care, respiratory and other services, as needed.
- Schedules created to avoid overstimulation.
- Patient rooms are identified by sign on door and at the bedside to cue promotion of a quiet environment.
- Effort made to assign room that minimizes overstimulation.

Please lower your voice.
Keep noise to a minimum.
E: Emphasis on Education

- Family factors
  - Crisis mode
  - Coping responses
  - Learning curve
  - Family Systems

- Education Factors
  - Written and verbal
  - Consistency; Repetition
  - Readiness & Sensitivity
  - Misconceptions
TEACH: Brain Injury Recovery
S: Types of Stimulation

- Tactile
- Vestibular
- Auditory
- Gustatory
- Visual
- Olfactory
Sensory Stimulation Kit
Examples of Stimulation: Tactile

- **Tactile**
  - Soft textures: cotton, feathers, fuzzy clothes, stuffed animals.
  - Rough textures: wash cloth, emery board, sand paper, burlap.
  - Temperature: heating pad, ice pack, glove filled with warm/cold water, cold hands.
  - Touch: massage, tapping, squeezing, hugs, kisses.
Examples of Stimulation: Vestibular

• Vestibular
  • Rolling in bed (includes linen changes)
  • Movement of wheelchair
  • Transfers
  • Rocking
  • Swinging
  • Movement on ball/scooter board.

• Considerations for vestibular stimulation:
  • Sensitivity to movement
  • Seizures
  • Spinal precautions
  • Orthopedic injuries
  • Intracranial pressure.
Examples of Stimulation: Auditory

- Clapping hands
- Whistle
- Bell
- Snapping
- Crinkling paper
- Background Noise (Roommate, Nursing station, Burnisher)
- Music
- Favorite TV or radio
- Familiar voices
- Books on tape
- Simple commands
- Recording of family member voices

Considerations for auditory stimulation
- Hearing loss
- Provide sound to both ears
- Audiology exam early
Examples of Stimulation: Gustatory

- Gustatory
  - Mint flavored toothette
  - Breath spray
  - Mint drops
  - Lemon glycerin swabs.

- Considerations for gustatory stimulation
  - These activities should be performed only after consultation with the patient’s physician or speech therapist.
  - Avoid putting anything inside the teeth if the patient has a tonic bite reflex.
  - Tastes/foods should only be placed in a child’s mouth on the advice of his or her speech therapist.
Examples of Stimulation: Visual

- Visual
  - Faces/people
  - Mirror
  - Flashlight/penlight
  - Photographs of family, friends, pets, etc.
  - Brightly colored or high contrast objects
  - Familiar objects
  - Visual threat
  - Lightbox

- Considerations for visual stimulation
  - Pre-morbid visual problems- glasses?
  - Objects should be held 6”- 8” from the face.
  - Consider the progression of visual skills.
Examples of Stimulation: Olfactory

- Olfactory
  - Pleasant/familiar smells - vanilla, cinnamon, flowers, perfume, toothpaste, coffee, favorite foods
  - Noxious/strong smells - garlic, curry, onion, vinegar, smelling salts
  - Smells encountered on nursing unit

- Considerations for olfactory stimulation:
  - Allergies
  - Avoid contact with skin
  - Do not place noxious smells too close to the nose
  - Ability of smell is decreased when trachestomy present
I: Stimulation Guidelines and Individualized Care

- Provide optimal environment
- Allow time for a response
- Present each item 3-5x
- Present only 1 stimulus at a time
- Utilize patient’s tolerance and response to guide session length
- Document findings in sensory stimulation log

- Provide appropriate stimulation based on patient’s level of arousal at time of session
- STOP when the patient stops responding or has a strong negative response
- Allow time for rest as necessary
- Avoid overstimulation
- Avoid habituation
Patient Responses

- **Generalized**
  - Change in tone
  - Agitation
  - Calming
  - Eye opening
  - Change in vital signs
  - Munching/suckle
  - Startle
  - Nasal flaring
  - Blinking/flinching
  - Change in facial expression

- **Localized**
  - Turning head or eyes away from or toward stimuli
  - Visual fixation and tracking
  - Pushing stimulus away
  - Withdrawal of extremity from noxious stimulus
  - Sniffing olfactory stimulus
  - Initiation of simple command following
## Sensory Stimulation Log

<table>
<thead>
<tr>
<th>Category</th>
<th>Pre Stimulation/State</th>
<th>Type of Stimulant</th>
<th>Time</th>
<th>Response</th>
<th>Comments</th>
<th>Initials</th>
</tr>
</thead>
<tbody>
<tr>
<td>Auditory</td>
<td>Example: Laying on back with eyes closed</td>
<td>Example: CD player with Sue’s favorite sound</td>
<td>Example: 10:00 am</td>
<td>Example: Laying on back but eyes seemed to flutter a little</td>
<td></td>
<td>Example: DJ</td>
</tr>
<tr>
<td></td>
<td>□ eyes open</td>
<td>□ music</td>
<td>□ eyes open</td>
<td>□ eyes open</td>
<td>□ eyes open</td>
<td>□ eyes open</td>
</tr>
<tr>
<td></td>
<td>□ eyes closed</td>
<td>□ talking</td>
<td>□ eyes closed</td>
<td>□ eyes closed</td>
<td>□ eyes closed</td>
<td>□ eyes closed</td>
</tr>
<tr>
<td></td>
<td>□ in bed</td>
<td>□ extra people in room</td>
<td>□ turn eyes to sound</td>
<td>□ turn head to sound</td>
<td>□ turn head to sound</td>
<td>□ turn head to sound</td>
</tr>
<tr>
<td></td>
<td>□ in w/c</td>
<td>□ on back</td>
<td>□ move body</td>
<td>□ move body</td>
<td>□ move body</td>
<td>□ move body</td>
</tr>
<tr>
<td></td>
<td>□ on back</td>
<td>□ lying on Right side/Left Side</td>
<td>□ change in vitals (RR, O2, HR)</td>
<td>□ change in vitals (RR, O2, HR)</td>
<td>□ change in vitals (RR, O2, HR)</td>
<td>□ change in vitals (RR, O2, HR)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Category</th>
<th>Pre Stimulation/State</th>
<th>Type of Stimulant</th>
<th>Time</th>
<th>Response</th>
<th>Comments</th>
<th>Initials</th>
</tr>
</thead>
<tbody>
<tr>
<td>Olfactory</td>
<td></td>
<td>Scent ___________</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>□ eyes open</td>
<td></td>
<td>□ eyes open</td>
<td>□ eyes open</td>
<td>□ eyes open</td>
<td>□ eyes open</td>
</tr>
<tr>
<td></td>
<td>□ eyes closed</td>
<td></td>
<td>□ eyes closed</td>
<td>□ eyes closed</td>
<td>□ eyes closed</td>
<td>□ eyes closed</td>
</tr>
<tr>
<td></td>
<td>□ in bed</td>
<td></td>
<td>□ munching</td>
<td>□ munching</td>
<td>□ munching</td>
<td>□ munching</td>
</tr>
<tr>
<td></td>
<td>□ in w/c</td>
<td></td>
<td>□ nasal flaring</td>
<td>□ nasal flaring</td>
<td>□ nasal flaring</td>
<td>□ nasal flaring</td>
</tr>
<tr>
<td></td>
<td>□ on back</td>
<td></td>
<td>□ swallow</td>
<td>□ swallow</td>
<td>□ swallow</td>
<td>□ swallow</td>
</tr>
<tr>
<td></td>
<td>□ lying on Right side/Left Side</td>
<td></td>
<td>□ movement of body</td>
<td>□ movement of body</td>
<td>□ movement of body</td>
<td>□ movement of body</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>□ change in vitals (RR, O2, HR)</td>
<td>□ change in vitals (RR, O2, HR)</td>
<td>□ change in vitals (RR, O2, HR)</td>
<td>□ change in vitals (RR, O2, HR)</td>
</tr>
</tbody>
</table>
## Non-Clinical Log

<table>
<thead>
<tr>
<th>Date</th>
<th>Time</th>
<th>Activity</th>
<th>Department</th>
<th>Staff Name</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Burnishing</td>
<td>Environmental</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Cleaning</td>
<td>Facilities</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Bed Change</td>
<td>Dietary</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Garbage change</td>
<td>School</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Reading/Schoolwork</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Other</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
EMR: REST Stimulation Log

```
<table>
<thead>
<tr>
<th>Sensory Stimulation Log - Occurrence #1</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Stimulation Category</strong></td>
</tr>
<tr>
<td>Auditory</td>
</tr>
<tr>
<td>Gustatory</td>
</tr>
<tr>
<td>Pre-Stimulation State</td>
</tr>
<tr>
<td>Eyes Open</td>
</tr>
<tr>
<td>On Back</td>
</tr>
<tr>
<td>Type Of Stimulant</td>
</tr>
<tr>
<td>Music</td>
</tr>
<tr>
<td>Leman swab (Staff only)</td>
</tr>
<tr>
<td>Moving of Left Arm</td>
</tr>
<tr>
<td>Lotion Massage</td>
</tr>
<tr>
<td>Vibration</td>
</tr>
<tr>
<td>Push in W/C</td>
</tr>
<tr>
<td>Object</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>Response</td>
</tr>
<tr>
<td>Eyes Open</td>
</tr>
<tr>
<td>Move Body</td>
</tr>
<tr>
<td>Turn eyes to Right/Left</td>
</tr>
<tr>
<td>Munching</td>
</tr>
<tr>
<td>Movement of body part</td>
</tr>
<tr>
<td>Time</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
</tbody>
</table>
```
Outcomes

• What are the intended outcomes?
  • Improvement in:
    • level of arousal/alertness.
    • comprehension and expression of language.
    • visual skills to increase interaction with caregivers/environment.
    • ability to follow simple motor commands.
    • appropriate responses to structured stimulation.
    • family understanding, coping, and carryover.
  • Decreased preventable complications.
Examples: Outcomes/Goals

• Joseph will turn his head toward sounds to bilateral sides (parent voice, music) 4/5 trials per session in order to increase his interaction with his environment.

• Rebecca will be able to visually track person/image in full horizontal plane 4/5 sessions per week in order to increase her interaction with her environment.
Examples: Outcomes/Goals

• Tony will open his eyes consistently to positional changes 4/5 sessions per week demonstrating increased level of arousal in order to improve his ability to interact with his environment.

• Jen will tolerate sitting upright in her wheelchair for 2 hours at a time 2x per day without periods of agitation/irritability (posturing, increased vitals) 100% of the time in order to interact with her environment.
Assessments/Outcome Tools

- Disability Rating Scale
  - Performed at admission, bi-weekly, and at discharge.
  - Developed to track a patient from “Coma to Community”; rates the effect of injury and assists in recovery timeline.

- Coma Recovery Scale-Revised
  - Performed at admission, bi-weekly, and at discharge.
  - Developed to assist with differential diagnosis, prognostic assessment, and treatment planning.

- Glascow Outcome Scale-Extended (pediatrics)
  - Performed at admission, prn, and discharge.
  - Developed to define broad outcome categories; reflects level of disability vs impairment.
Disability Rating Scale (DRS)
Coma Recovery Scale-Revised (CRS-R)

<table>
<thead>
<tr>
<th>Reason for Assessment</th>
<th>Initial</th>
<th>Discharge</th>
<th>Re-Evaluation</th>
</tr>
</thead>
<tbody>
<tr>
<td>CRS-R Total Score</td>
<td>(out of 23)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Auditory Function Scale**
- Consistent mvmnt to comm-4
- Reproduce mvmnt to comm-3
- Localize to sound-2
- Auditory startling-1
- None-0

**Visual Function Scale**
- Object recognition-5
- Object localize-reach-4
- Visual pursuit-3
- Fixation-2
- Visual startling-1
- None-0

**Motor Function Scale**
- Functional object use-6
- Automatic motor response-5
- Object manipulation-4
- Localize nocuous stim-3
- Flexion withdraw-2
- Abnormal posturing-1
- None-0

**Ommotor/Verbal Function Scale**
- Ineligible verbal-3
- Vocalization/oral mvmnt-2
- Oral reflexive mvmnt-1
- None-0

**Communication Scale**
- Functional accurate-2
- Nonfunctional intent-1
- None-0

**Arousal State**
- Attention-3
- Eye opening w/o stim-2
- Eye opening w/ stim-1
- Unarousable-0

Thur, Feb 5, 2015 07:55 by Kate Viaer Real Time
Questions