The Use of NeurOptimal® With a Young Adult With an Acute TBI - A Case Study

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Brian Drake
Jessica Bonner
Alan Bachers, PhD
Background

- Approximately 22 sessions in ‘07-’08 (16 yo)
- April 5, 2012-M/C accident
- Glasgow Coma Scale = 3 (3-15)
- Medical Dx = Grade II Diffuse Axonal Injury
- Severe Traumatic Brain Injury
- Unresponsive at scene, intracranial hemorrhage; seizure activity reported
- Prognosis - Uncertain
- Pain and seizure meds
At the time of Brian's admission, my main concern was his neurological status. It was easy to be distracted by his ortho injuries, but I've seen far too many motorcycle crashes and the head trauma that goes along with them. I can remember thinking, "Thank God, he was wearing a helmet!"
I forget now if he had a head bleed, but I think I remember Neurosurgeons I remember the pressures being low and thinking He has a chance to recover from this." I knew the ortho injuries could be fixed, but it was the extent of the head injury that was unknown

Shane Brost, RN, CCRN, Brian’s Critical Care Nurse for the first two days
Acute Phase

• SICU-Multiple fractures-legs, arms, hands, dislocations, pneumonia, other infections, non responsive, respirator, cranial pressure monitor, surgeries for fractures
• Unresponsive for days, some “surfacing”
• April 7, OK to begin NO, April 9th first session
• Day 8, Linda Tevis’ personal system arrived
• Pre and post baselines show training effect
“We didn’t know, for the first two days, whether Brian would make it.”
Shane Brosch, RN, Critical Care Specialist
NuerOptimal Plan
per A. Bachers and P. Friesen

• Dr. Alison Wilson - OK’d NF 4/7/12
• Two sessions per day, introduce Zen 3 gradually, watch for activation, per A. Bachers
• Typical pattern-5-6 sessions over Thurs-Sun; Linda’s system arrived 4/13
• Jess started training Brian ASAP and depending on her class schedule, trained him during the week 1-4 times total ~ 6 times per week
<table>
<thead>
<tr>
<th>People caring for me:</th>
<th>My goals / plan:</th>
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<tbody>
<tr>
<td>Nurse: <strong>Kristen</strong></td>
<td>Neurostatus</td>
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<tr>
<td>Doctor: <strong>SICU/Trauma</strong></td>
<td>Wean vent</td>
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<tr>
<td>Clinical Associate: <strong>Cathy</strong></td>
<td>pain control</td>
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<td>Other Care Providers:</td>
<td>Turn 90</td>
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<tr>
<td>Dr. Wilson ok w/ Neurofeedback therapy</td>
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<tr>
<td>Vit D from family</td>
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*Your comfort is our priority. Please alert us if you are in pain.*
Neuroptimal pre and post baselines

- 1-2 sessions a day
- Personal and professional systems
- Sometimes the “post” was also a “pre”
- Response pattern often but not always delayed
- Brian heavily medicated; lots of line noise
- Next series-prebaseline, journey, postbaseline
- (actual baseline video snippets, spectographs, CCACs)
Prebaseline 4/9/12
4/09/12 prebaseline spectograph
4/09/12 journey
4/09/12 journey
postbaseline
Postbaseline 4/9/12
Prebaseline 4/11/12
Post-baseline 4/11/12
4/11/12 post baseline
Clinical progress

- Can follow some commands
- No seizures as of 4/10, Dilantin ends ~ 4/18
- 4/11/12 still on ventilator
The Step down unit, 1st time OOB
• 4/14/12-two sessions:

• Pre-baseline 1 at noon: video, spectograph CCAC
• Post-baseline 1 (12:40) video, spectograph CCAC

• Pre-baseline 1 (4:30): video, spectograph, CCAC
• 2nd journey: video, spectograph, CCAC
• Post-baseline 1 at 5:15: video, spectograph, CCAC
4/14/12  1st prebaseline at noon
Prebaseline 2  4/12/12
4/14/12 1st prebaseline
Prebaseline 4/14/12 (1st)
1st post-baseline 4/14/12  12:40 pm
1st post-baseline 4/14/12
Postbaseline 4/14/12 (1st)
4/14/12 2nd prebaseline  zMirror (also post)
4/14/12 2\textsuperscript{nd} prebaseline spectogram—also a post of the day’s first session
2nd journey 4/14/12, 4:35 pm
2nd journey spectograph
2nd journey CCAC  4/14/12
4/14/12  2nd postbaseline at 4:30 pm
Postbaseline 4/14/12 (2)
Clinical progress

• 8 sessions by 4/16/12; swallowing, sherbert, less restless; seemed to be tracking
• By 4/18, 4 more, improved motor control, nudging Jess with his foot and squeezed her hand, wiggled feet upon request
• Hand surgery 4/19, hugely disruptive
• 4/23, Asked by speech therapist to identify an object; Brian said “pear” and said “Andrei” when his friend entered the room
• He’s coming back!
Clinical progress

• 15 sessions in 18 days, 5 over 3 day period
• 4/23-Isolated, context ,words-”hi”
• Expressing full range of emotions, aware of impact of accident
• Sitting in chair w assistance
• 4/25-to rehab w/ no tubes
• 5/1-more present
• Speech intelligibility variable (What’s all that shit doing on the floor?”)
4/29/12 1st prebaseline
4/29/12  1st base-line
4/29/12 1st pre-baseline
4/29/12 1st prebaseline ccac
4/29/12  1st journey
4/29/12 1st journey spectogram
May 2012

• 5/2-eating everything in sight, own clothes, standing and able to walk w support in PT
• “How are you?”
• Walking entire hall w/ assistance
• Staff are “pleasantly surprised” by the amount and speed of his progress
5/28/12 pre-baseline  7 weeks out
5/28/12 pre-baseline spectograph
5/28/12 pre-baseline CCAC
5/28/12 post-baseline
5/28/12 post-baseline CCAC
CCACs-Pre and post

- 4/09/12  6048
- 4/11/12  125
- 4/12/12  2566
- 4/12/12  891
- 4/14/12  744
- 4/14/12  790
- 4/21/12  1046
- 4/21/12  51
- 4/22/12  578
- 4/22/12
- 4/27/12  670
- 773  ?
- 1413
- None
- 3001 Noise
- 388  TE
- 182  TE
- 251  TE
- 293  ?
- 6785 Noise
- None
- 23
CCACs-Pre and post

- 4/28/12 449
- 4/28/12 82
- 4/29/12 76
- 4/29/12 183
- 5/04/12 312
- 5/05/12 545
- 5/06/12 366
- 5/11/12 1204
- 5/28/12 687
- 9/21/12 355
- 6/23/13 633
- 2/08/14

- 6728
- None
- 32
- 160
- 4089
- None
- None
- None
- 243
- 281
- 257
Jessica Bonner’s observations about the impact of NeurOptimal on Brian’s recovery
Chart Review

• RN with 10 years experience in rehab and TBIs:

• “There is nothing other than the NF training that can explain the extent and rapidity of his progress.”

• Brian’s neurologist, 11/13:” If there were no infections, excellent nutrition and a great deal of rehab, those factors especially in combination could explain his unusual progress”
• Dr. B continued
• “While I can’t say the NF was responsible for his progress I can’t rule it out. More research should be done.”
• Constant staff comments beginning on the step down unit about how well and quickly Brian progressed-MDS, RNs, PT staff, speech staff, aides.
February 9, 2014, pre-baseline
February 9, 2014 pre-baseline
February 9, 2014, pre-baseline
February 9, 2014 post-baseline
CURRENT STATUS

OVR NeuroPsych testing:

Beck Anxiety Inventory-10=
Overheating, inability to relax,
Fear of the worst happening, racing heart rate,
uneasiness, general
nervousness and fear of losing control”

Superior range  IQ
Ability to sustain attention, concentration,
and exert mental control has not  been
affected. Lt memory appears to most effected.
Cannabis dependency
Dysthymic pattern may be effecting memory
Info retention maximized by pairing learning material
performance and repetition
Neuropsychologist-ID specific techniques to improve memory
Chart Review

• I have the idea that neurofeedback training is an important factor in Brian's healing. After reviewing his acute care medical records and knowing the extent of his neurological and orthopedic injuries, his recovery times are remarkable in comparison to others without NF training opportunities. Thank you for the chance to review his case.

• By the way, wanted to let you know that we just received our personal unit to start training with Dad hopefully tomorrow.
• Thanks for all you have done,
• Leah
CONCLUSION

It is highly likely that the intensive neurofeedback training with NeurOptimal made a substantive, positive difference in Brian’s recovery from the TBI.

* Leah Mechling, RN, TBI Rehabilitation summary of her chart review: was nothing other than the neurofeedback training that could explain the rapidity and substance of Brian’s recovery."

• Pre and and
• Surges of progress post groupings of sessions
• Postbaselines

• Overall quality and speed of recovery relative to severity of injury
• (GCS of 3, DA,1, level 2)