



NEURO
INSTITUTE

Continuing Education for Rehabilitation Professionals



Behavioral Rehabilitation Following Pediatric Brain Injury

Rob McDaniel, MS, RVP, NeuroRestorative
NeuroRestorative Timber Ridge – Benton, Arkansas

Learning Objectives



At the end of this presentation, you will be able to:

- Demonstrate an understanding of why learning and behavior problems often have long-term implications for children who have sustained traumatic brain injury
- Differentiate behavioral management versus behavioral change
- Identify at least three common behavioral functions

Pediatric Rehab Following TBI Isn't Always Fun & Games



The Human Brain

- One of the most intensely studied, yet least understood organs
- This past decade has resulted in progressive advancements concerning neuronal make-up, function and emergent intervention following trauma
- As survival rates following injury have increased – so have focuses beyond initial trauma interventions
- Residual deficits have become increasing concerns not only of the hospital stay – but also of residential, community & school re-entry
- Issues involving residual deficits are significantly prevalent in pediatric and adolescent populations

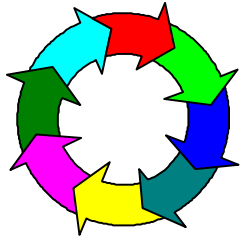
Prevalence & Etiology

- Children & Adolescents make up the greatest proportion of people surviving TBI
- Estimated incidence doubles between the ages of 5 and 14
- Peaks for both males and females during adolescence to early adulthood – approximately 250 per 100,000
- 1/3 to 1/2 of adolescents are injured in motor vehicle accidents
- In younger children, pedestrian traffic accidents are the leading cause followed by falls

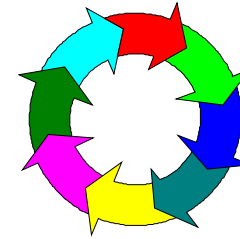
Timeframe/Focus Following Pediatric – Adolescent TBI

- Immediate Concerns — Obviously Medical in Nature
- Short-term Focus — Physical Characteristics & Abilities
- Most Common Long-term Effects — Learning Memory & Behavior

Behavior can be grouped into two global categories



Physiologically Based



Environmentally Governed

Following traumatic insult to the brain, interactions are often disrupted and altered – resulting in what we consider dysfunctional or disordered behavior.

Behavior Disorder Classifications Following TBI

- Active (explosive – impulsive – disinhibited)
- Passive (insightless – slow – lacking motivation)
- Syndromal (manipulative – ritualistic – cyclothymic)

Neurobehavioral Outcome Sequelae

- Injury may obliterate previously learned skills
- There may be a reduction in the efficiency of skill performance
- May be a reduction in the developmental potential thereby altering the future of skills not yet obtained

A natural and challenging transition from concrete to abstract often plagues the process for children with TBI.

The Problem

Behavioral dysfunction is a pervasive element of pediatric/adolescent brain injury

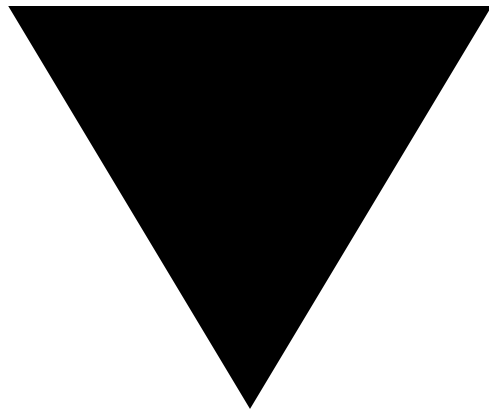
The challenge and often misguided approaches lie in how to assess and treat such conditions.

Behavioral Assessment & Treatment

Step 1 – Rule out Physiological/Medical-based Causes

- Limbic system dysfunction
- Temporal lobe seizure activity
- Increased ICP
- Medication regimen
- Physiological-based motoric agitation associated with re-emergence of higher level cortical functioning
 - (consider location and severity of injury)
 - (consider time since injury)

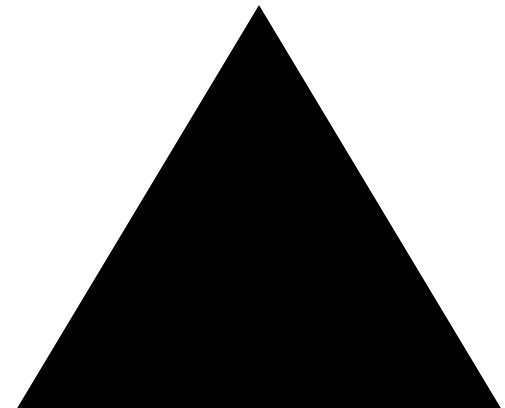
Behavior Management – Necessitated for physiological/medical causes. It is utilized when the patient is unable to use adaptive behaviors. Behavior management involves interventions to CONTROL behavior. Safety is of primary concern. Antecedent-based approaches include low stimulation settings, controlled environments, prophylactic medications and vail bed use. Consequent-based approaches include PRN medications and mechanical restraints in response to extreme hyper-agitation.

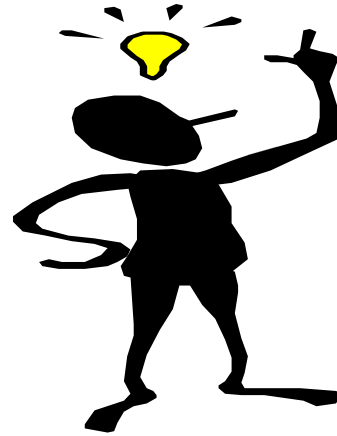


Antecedent

Behavior

Consequence





Remember that re-learning and learning are still taking place when physiological-based causes are in effect.

These processes involve environmental determinants of behavior and can lead to the development of maladaptive repertoires.

Step 2 – Once medical variables are ruled out or controlled, consider the need for a behavior modification approach

- This approach focuses on teaching appropriate replacement behaviors for maladaptive behaviors
- Uses the principles of learning and applied behavior analysis as an assessment and treatment modality

Applied Behavior Analysis



- Systematically investigates factors that influence behavior
- First step is ALWAYS rule out medical causes (for safety & possibly for later treatment)
- Uses data-driven diagnostic techniques prior to intervention implementation

The “All Encompassing Panacea Approach” of reward good behavior and punish bad behavior has long since been outdated.

- An approach that attempts to intervene in the same fashion in all cases is not only simplistic but is likely to fail in many instances
- Applied behavior analysis uses single subject design methods with observable and precisely defined behavioral data analyzed across baseline and treatment periods

Components of Assessment

Antecedents – Precede or accompany the behavior. May include environmental variables, discriminative stimuli, states of deprivation or other establishing operations.

Topography of Behavior – Frequency, duration, latency, intensity, etc...

Consequences – Determine operant components which maintain the behavior. An operant is a class of behaviors that are controlled (at least in part) by their consequences.

Objective Definition – The behavior in question must be defined in observable, measurable and quantifiable terms.

Behavioral Function = Relation Between Behavior & Environment

Determination of Behavioral Function

Reinforcers – Maintain or increase behavior when they are presented or removed.

Punishers – Reduce or eliminate behavior when they are presented or removed.

Looking for the reinforcing value of the environment which maintains behavioral function. Common behavioral functions include: Attention – Escape/Avoidance – Communication – Stimulation – Access to Tangible Reinforcement and Counter Control

Why are maladaptive behavior patterns used to meet functions?

- Course of least resistance
- Age of the child
- Diminished or obliterated skills
- Injury site (i.e. frontal lobe injury)
- Stimulus deprived environments (decreased behavioral output, increased self stim, increased attention seeking, increased dependency)
- Enabling environments (escape/avoidance, protective sheltering)

Types of Functional Analyses

Informal Analysis –

- Screening Tool – Questionnaire/Interview
- Quick – Easy – Requires little training
- Least Intrusive
- Does not reveal causal relations but can assist with deriving hypotheses
- Hypothesized functions can be (should be) pilot tested prior to intervention implementation

Informal Analysis Example (FAST)

A high score on questions answered “Yes” would indicate a hypothesis of escape maintained behavior

- Usually occurs in the presence of others?
- Usually occurs when asked to perform a task?
- When behavior occurs, you usually give a break?
- Person usually complains or resists when asked to perform a task?
- Usually does not occur when no demands are placed on the person?

Descriptive Analysis

- Direct observation under Naturalistic conditions
- Analysis of behavior's antecedents & consequences
- Allows for analyses over time, patterns, trends, etc...
- Does not rely on recall of events
- Correlational – not causal – possibility of making spurious conclusions of behavioral function exists
- Recommended that hypothesized function can be pilot tested

Example of Descriptive Analysis

Antecedent

Instructed to complete homework

Classroom lecture

Playground – kickball with 8 others

Behavior

Yelling & Swearing

Got out of seat & walked around room

Yelling & Swearing

Consequence

Teacher sat beside him

Reprimanded in front of the class

Teacher stopped game and let him choose his team

Probe Analysis

- Brief experimental intervention in the natural environment
- More intrusive
- Environment is manipulated – consequence may or may not be reinforcing
- Maximized validity for predicting therapeutic interventions
- Measurement & interventions must be individually developed
- Potential of jeopardizing safety – medical consultation should be obtained

Probe Analysis Example

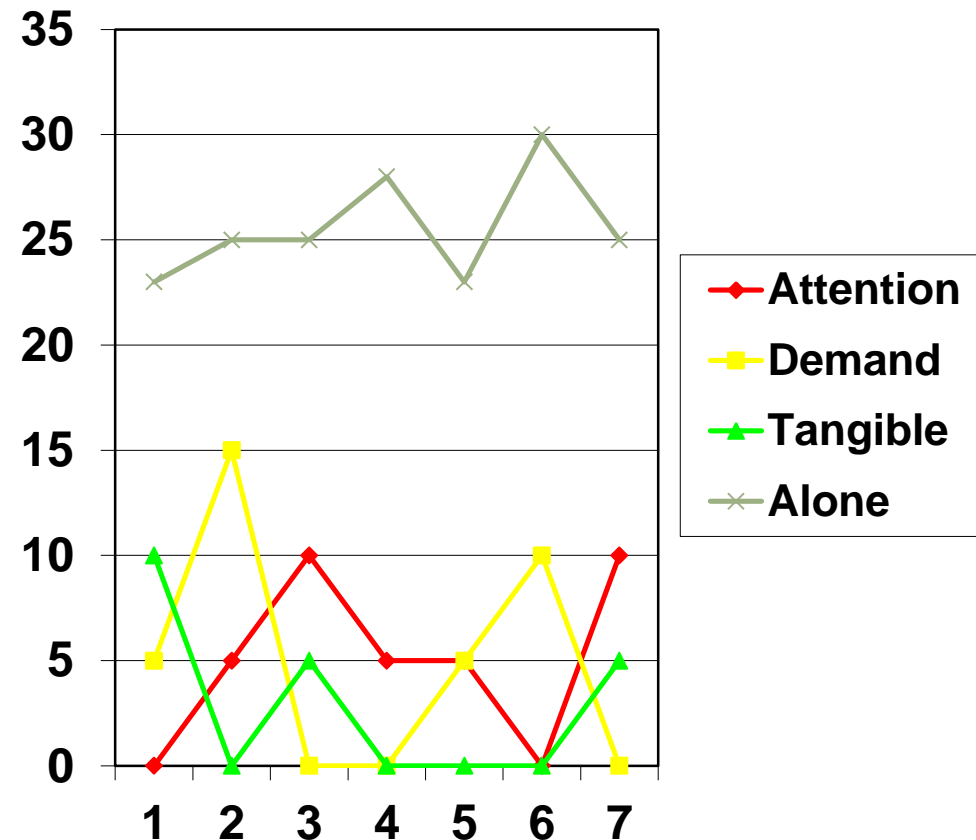
- Chris exhibits the problematic behavior of making strange noises in the school classroom and when her parents are with her in public settings
- It is hypothesized that this behavior is maintained by social attention
- For one week the teacher and parents are instructed to provide Chris with specific attention (by looking at her and speaking to her) each time she makes a strange noise. For the second week the conditions are reversed. The teacher and parents are instructed to actively ignore any strange noises – no matter how bad the situation may seem.
- Specific data is recorded and analyzed for each condition.

Experimental Analysis

- Analysis of analog sessions in a controlled, experimental environment
- Rate of responding across controlled conditions (contingent attention, escape, austure environments & unstructured play)
- Reveals casual data on environmental/behavioral operations
- Time consuming/labor intensive
- Skilled practitioners required
- Safety risks – require medical consultation
- Risk of exposing target behaviors to new reinforcers

Experimental Analysis Example

- Experimentally controlled conditions
- Contingent attention, demand, tangible reinforcement and time alone
- Comparison of response patterns across trials and conditions
- Measure percent interval occurrence for each condition/session



Where to Start – When to Advance

- Almost always start with informal and descriptive analyses (get the data)
- Probe assessments should be used to increase external validity or when a reasonable hypothesis cannot be generated
- An experimental analysis should only be used by psychologists/behavior analysts with specific training and experience

Interventions

- Teach appropriate/adaptive methods of meeting functions
- CRF progressing to IRF
- Provide massed, spaced & distributed learning trials
- Allow time
- Must be consistent
- Analyze trends

Adjunct Areas to Consider

- Extinction – a previously reinforced operant is no longer followed by its usual reinforcing consequences
- Initial increases in behavior
- Must be applied with near perfect consistency, or behavior becomes more resistant to change
- Cannot be solely used for potentially dangerous behaviors
- May reinforce behaviors with escape functions

Adjunct Areas to Consider

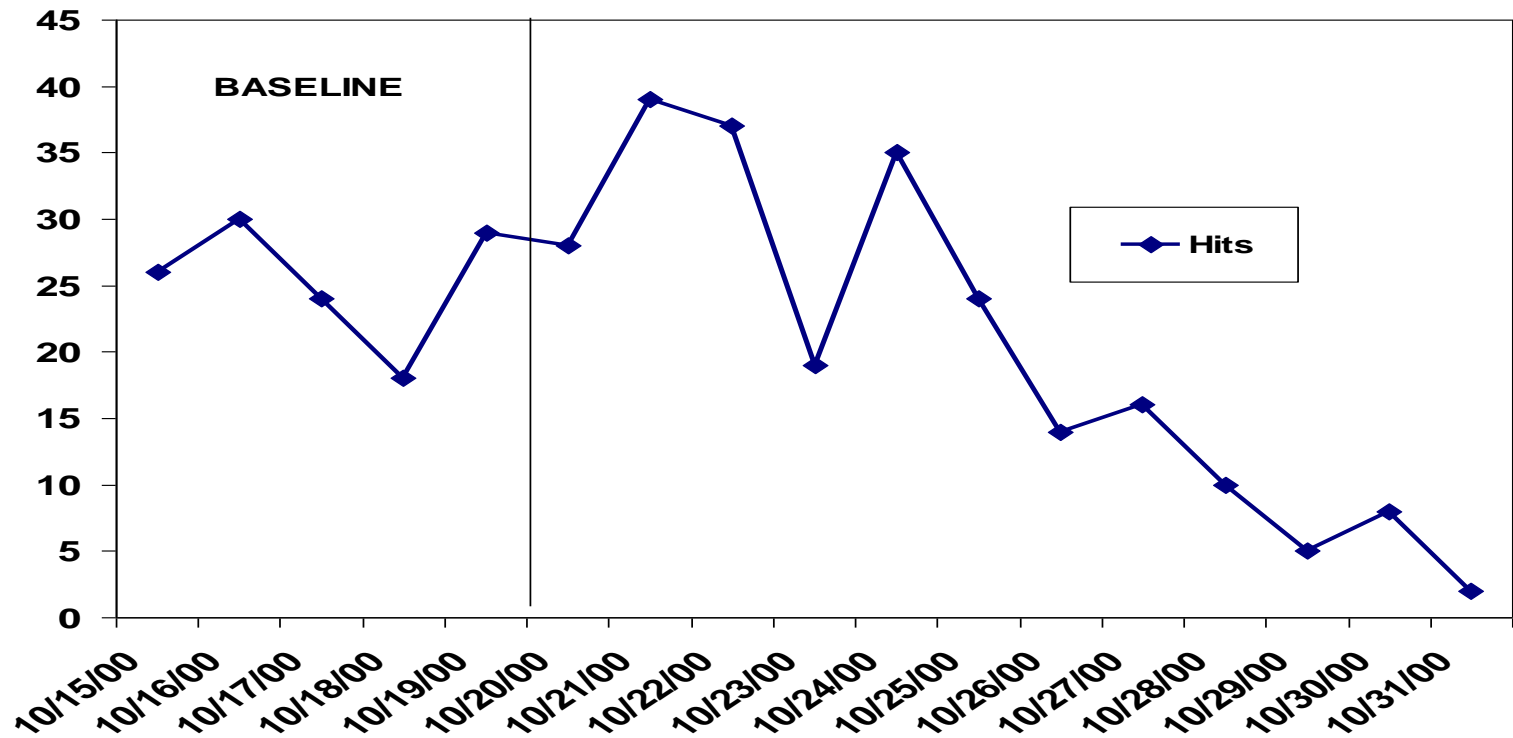
- Punishment – presentation or removal of a consequence/stimulus which decreases behavioral output
- Induction effects – decreases all behavior
- Emotional responding – retaliation
- Interaction focus is negative
- Raises ethical concerns
- Suppresses – does not teach
- Punishment procedures may be necessary for severe SIB

Physician Related Considerations

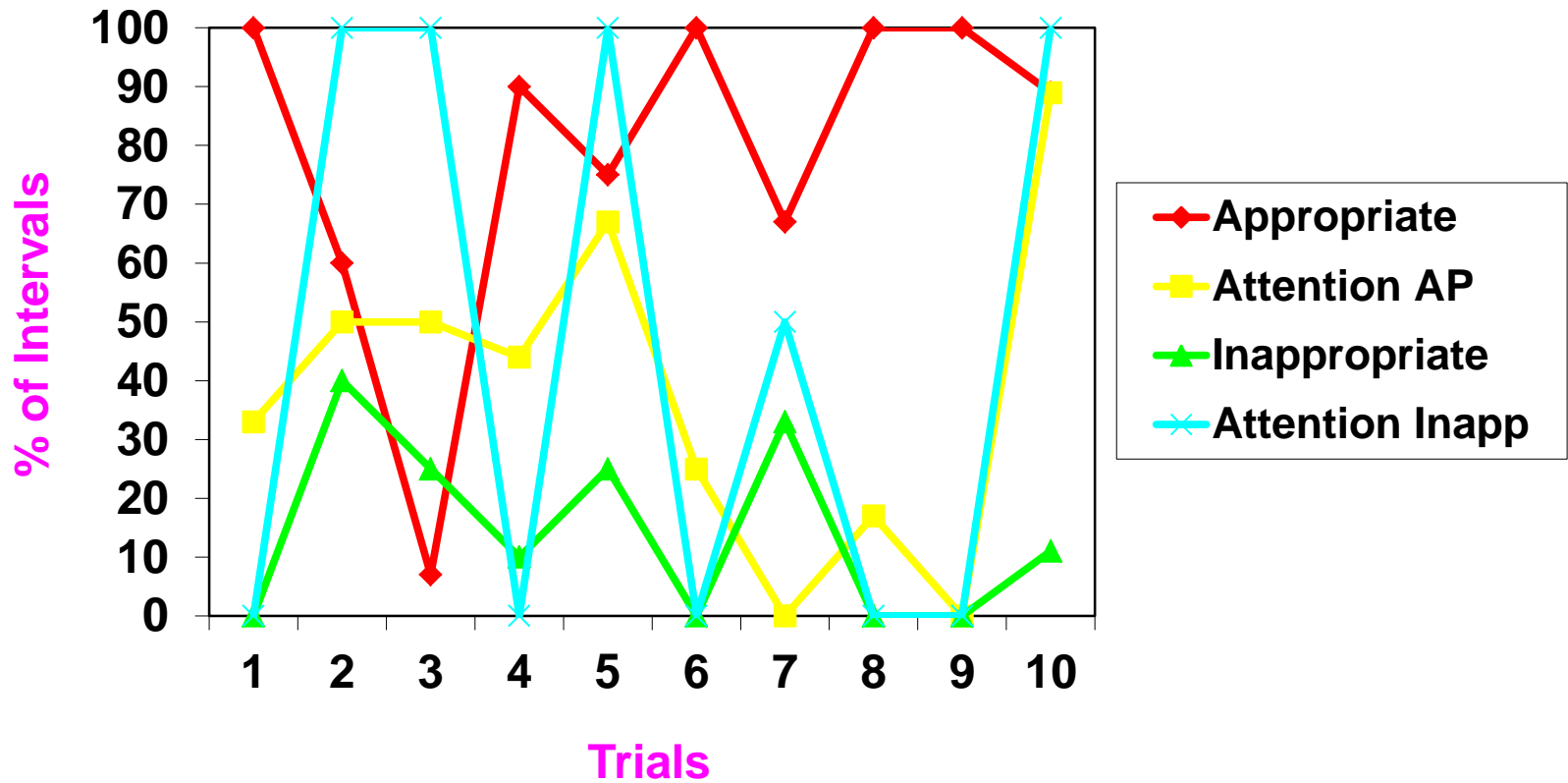
- Medications – ABA combination treatment
- Data-based decisions regarding medication usage
- Informal/Descriptive analyses
- Assisting with education and support of hospital staff
- Family/Caregiver counseling & education
- Ask for data – (videos worth a 1000 WORDS)
- Assessment and treatment should be based on objective data, not hunches or emotions

Extinction Burst

Joey B.

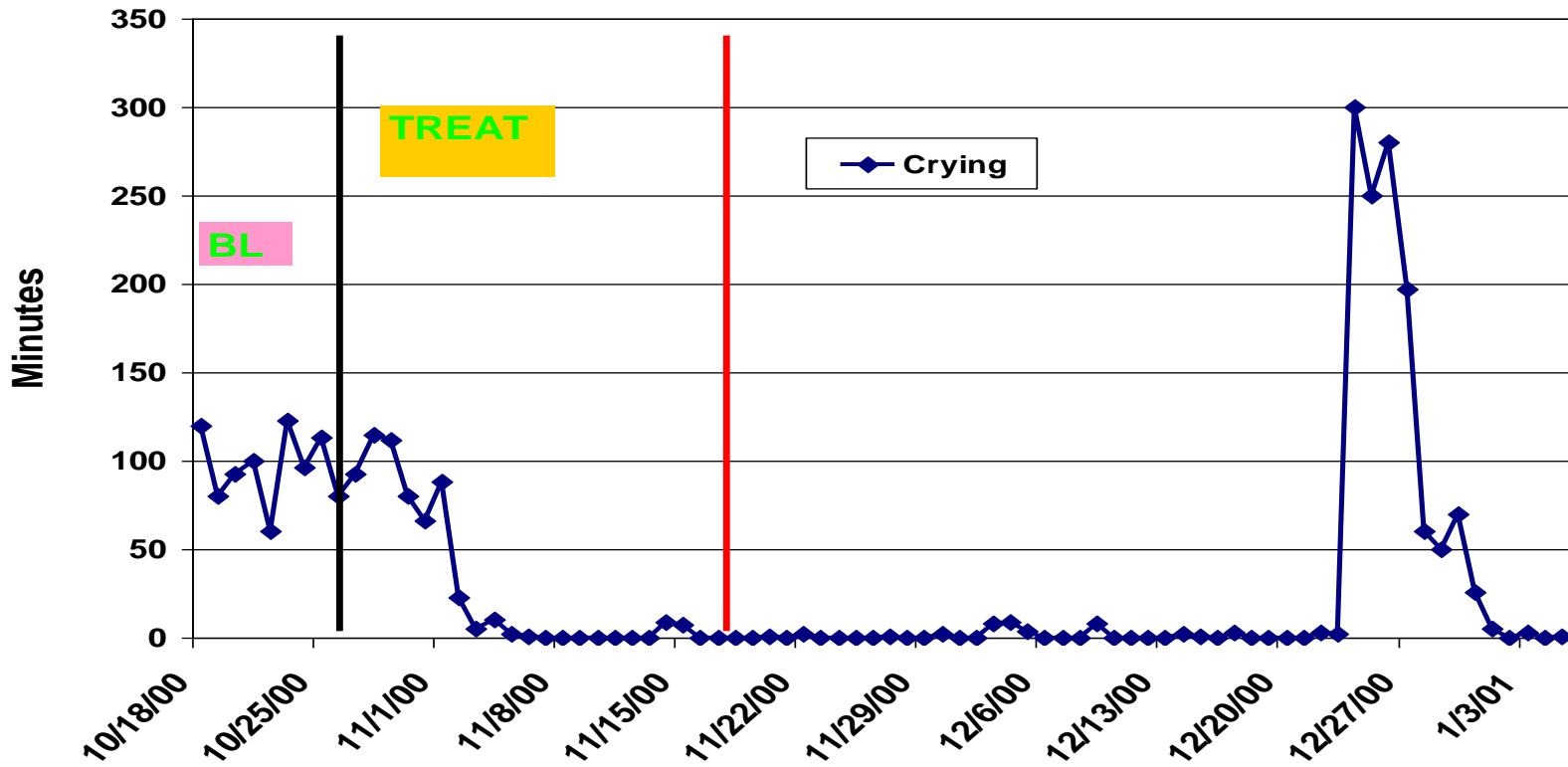


Descriptive Analysis



Medical Variables

13 Year Old Female



The End.
Thank You!