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Antecedent Techniques Used to Regulate Aggressive Behavior in Patients with Brain Injuries: A Teaching Module

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This Scholarly Project Paper, submitted by Elizabeth A. Freidel and Megan J. Larson in partial fulfillment for the Degree of Master's of Occupational Therapy from the University of North Dakota, has been read by the Faculty Advisor under whom the work has been done and is hereby approved.

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ABSTRACT

An estimated 1.7 million individuals sustain a brain injury each year (Centers for Disease Control & Prevention, 2010). Some behaviors associated with brain injuries include: decreased academic performance, severe aggression, self-injurious behavior, and suicidal and homicidal ideation (Finfgeld-Connet, 2009; Pace, Dunn, Luiselli, Cochran, & Skowron, 2005). The aforementioned behaviors pose a risk to the well-being of patients, therapists, healthcare providers and caregivers. The purpose of this scholarly project was to explore current methods used to minimize dangerous behavioral clients and ultimately provide a teaching module of antecedent techniques - a form of intervention used in order to reduce a behavior (Pace et al., 2005) - to therapists, care givers, healthcare workers, and any other persons who interact on a consistent level with brain injured individuals.

A thorough literature review of antecedent interventions used with individuals who have sustained a brain injury was conducted with a focus on young and middle aged adults using PubMed, Cumulative Index to Nursing and Allied Health Literature (CINAHL), Google Scholar, and the Academic Search Premier databases. Some key terminology used during the literature search included: *antecedent*, *brain injury*, *occupational therapy*, and *behavioral management*. It was discovered that maladaptive behaviors of those with traumatic brain injuries (TBI) limit their participation in daily activities. Often times, healthcare workers, therapists, and caregivers withstand the worst of aggressive behaviors brought on through symptomology of a brain injury.

While literary authors thoroughly described the behaviors and limitations that may occur following a brain injury, a paucity of educational workshops to educate professionals and caregivers was noted. Guided by the Model of Human Occupation, this educational workshop addresses the roles, habits, and routines of individuals with TBIs. Constructivism and Social Learning Theory were used to guide the product creation. The culmination of the literature review resulted in the creation of a teaching module entitled *Antecedent Techniques Used to Regulate Aggressive Behavior in Patients with Brain Injuries: A Teaching Module.*

Antecedent Techniques Used to Regulate Aggressive Behavior in Patients with Brain Injuries: A Teaching Module is a workshop designed to provide healthcare workers with greater understanding and application of antecedent techniques that can be used in conjunction with other interventions for individuals with TBIs who exhibit aggressive behaviors. The workshop includes a two-hour literature review on brain injury followed by a one-hour implementation session to integrate and rehearse strategies learned. Examples of antecedent techniques in this scholarly project include: desensitization, creating a just-right challenge, environmental modifications, patient-centered care, participation in meaningful activities, assisting the individual in management of difficult situations, and normalization of behaviors (Feeney et al., 2001 & Finfgeld-Connet, 2009; Pace et al., 2005).

Approximately 60% of individuals with a mild brain injury exhibit aggressive tendencies towards themselves or others (Rao et al., 2009). Through the use of these antecedent intervention techniques, we anticipate healthcare workers will ultimately be able to decrease problematic behaviors, increase therapeutic gains, and improve overall safety of people with traumatic brain injuries and others who are involved in their lives and occupations.

CHAPTER I

INTRODUCTION

On average, approximately 1.7 million people experience a traumatic brain injury (TBI) each year (CDC, 2010). Of these individuals, approximately 52,000 people die, and 275,000 people are hospitalized for their injury and survive (CDC, 2010). Approximately 60% of individuals with a mild brain injury exhibit aggressive tendencies towards themselves or others (Rao et al., 2009). Antecedent techniques have shown to be helpful in decreasing maladaptive behavior in the brain injured population. An antecedent is a form of intervention used in order to reduce a behavior (Pace et al., 2005). Some examples of antecedent techniques include: environmental modifications, positive talk training, providing personal space, and therapeutic use of self. Authors were unable to locate literature or any information of a workshop existing to provide training with these strategies. Therefore, a workshop was designed with the population of healthcare workers, therapists, and caregivers in mind.

Viewing each brain injured individual through a Model of Human Occupation (MOHO) perspective (volition, habituation, and performance capacity) enhances engagement in daily tasks and meaningful activities. This model allows participants of the workshop to equally view each brain injured individual's occupational identity. While MOHO is used to address viewing the brain injured individual, a theory must also be utilized in order to address the learning styles of the participants attending this workshop. Two adult learning theories were used in creating

Antecedent Techniques Used to Regulate Aggressive Behavior in Patients with Brain Injuries: A Teaching Module. These included the social learning theory (SLT) and constructivism. Through use of constructivism, participants will take previously known knowledge regarding TBIs and build on that foundation with the information provided through the education module (Dreeben, 2010). SLT, however, is specifically used in the application piece while learners can observe others' behaviors and modeling. (Dreeben, 2010). Constructivism and SLT are used in conjunction to sculpt one's own application of antecedent techniques.

A list of common terminology included in this scholarly project include the following:

Acquired Brain Injury: Describes various events that affect the functioning of an individual's brain. Examples could include traumatic brain injury (open or closed head trauma), brain infections (encephalitis), tumors, or stroke (Slifer & Amari, 2009).

Aggression: A forceful physical, verbal, or symbolic action. It may be appropriate and self-protective, indicating healthy self-assertiveness, or it may be inappropriate. The behavior may be directed outward toward the environment or inward toward the self (Venes, 2005).

Agitation: Excessive restlessness, increased mental and physical activity (Venes, 2005).

Antecedent: A form of intervention used in order to reduce a behavior (Pace et al., 2005).

Traumatic Brain Injury: The National Institute of Neurological Disorders and Stroke (2010) described a TBI as

> A form of acquired brain injury, occurs when a sudden trauma causes damage to the brain. The damage can be focal – confined to one area of the brain – or diffuse – involving more than one area of the brain. TBI can result from a closed head injury or a penetrating head injury. A closed injury occurs when the head suddenly and violently hits

an object but the object does not break through the skull. A penetrating injury occurs when an object pierces the skull and enters brain tissue.

The remainder of this document includes a review of current literature and findings regarding brain injury demographics and symptomology as well as assessment and intervention utilized while working with this population, the role an occupational therapist (OT) plays in the intervention process, and the evidence to support using antecedent techniques when working with the population of brain injured individuals. Chapter III provides a detailed description of the process for gathering information and developing the *Antecedent Techniques Used to Regulate Aggressive Behavior in Patients with Brain Injuries: A Teaching Module*, which is included in Chapter IV. Chapter V presents a summary of the purpose and use of the product. It also offers recommendations for future implementation, development and research. A detailed analysis of literature supporting the topics identified in this introduction has been provided in Chapter II.

CHAPTER II

REVIEW OF LITERATURE

As occupational therapy continues to grow and diversify its services throughout the world, therapists are continuously reminded by those whom comprise their caseloads about how common traumatic brain injuries (TBIs) are becoming, and how treatment, patient demographics, and community functioning of these patients vary dramatically.

The Brain Injury Association of America (n.d.) has defined TBI as

> An insult to the brain, not of a degenerative or congenital nature but caused by an external physical force, that may produce a diminished or altered state of consciousness, which results in an impairment of cognitive abilities or physical functioning. It can also result in the disturbance of behavioral or emotional functioning. These impairments may be either temporary or permanent and cause partial or total functional disability or psychosocial maladjustment.

The National Institute of Neurological Disorders and Stroke (2010) described a TBI as

> A form of acquired brain injury, occurs when a sudden trauma causes damage to the brain. The damage can be focal – confined to one area of the brain – or diffuse – involving more than one area of the brain. TBI can result from a closed head injury or a penetrating head injury. A closed injury occurs when the head suddenly and violently hits

an object but the object does not break through the skull. A penetrating injury occurs when an object pierces the skull and enters brain tissue.

In order to know how to manage these injuries and support the individuals who sustain them, health care professionals need to know the facts about brain injury and the symptoms that may accompany the injury including aggression. The main purpose of this literature review is to identify the effects and symptoms associated with brain injury and how occupational therapists and other health care professionals can use evidence based practice to promote the health and wellness of clients who sustain TBIs. Chapter II is further comprised of information regarding the demographics of those who sustain TBIs.

Demographics

TBI Estimates/Statistics

Brain injuries are a major public health problem and prevalence with which they occur in the U.S. is staggering. Statistics provided by the Centers for Disease Control and Prevention (CDC, 2010) illustrate a dramatic story of a head injury in the United States. On average, approximately 1.7 million people experience a TBI each year (CDC, 2010). Of these individuals, approximately 52,000 people die, and 275,000 people are hospitalized for their injury and survive (CDC, 2010). Of the 1.7 million people who sustain a TBI, approximately 1.4 million of these individuals (80% of the population sustaining TBIs annually) are treated and released from hospital emergency rooms (CDC, 2010). According to the National Institute of Neurological Disorders and Stroke (2010), more than five million Americans who are alive today have sustained a TBI resulting in a long-lasting need for assistance in performing their daily activities. The Brain Trauma Foundation (2010) reported that approximately 1.6 to 3.8 million sports-related TBIs occur each year, and some believe that between 150,000 and 300,000 service

members who have been overseas to Iraq have acquired some level of a TBI. Approximately 30% of service men admitted to Walter Reed Army Medical Center have been diagnosed with TBI (Brain Trauma Foundation, 2010). The National Institute of Neurological Disorders and Stroke (2010) reported that the impact of persons sustaining brain injuries in the U.S. has a financial impact if greater than $56 billion per year. In fact, Feeney, Ylvisaker, Rosen, and Greene (2001) reported that community support programs are incredibly cost-effective saving up to $125,000 per year for the state per person. If community support programs can save over $100,000 per person, it is incredible to think of what training each health care worker involved with brain injuries could save when it comes to cost-effectiveness. In addition to being cost-effective, there is a vast number of individuals who would benefit from this form of care in the community.

Etiology

The causes of TBIs are as diverse as those who acquire them, and a lack of agreement between sources about the etiology of TBIs is present in existing literature. According to the CDC (2010), falls are the leading cause (35.2%) and account for 50% of TBIs among children aged 0-14 years and 61% of all TBIs among adults aged 65 or older. The second leading cause of TBI is motor vehicle accidents (MVAs) following at 17.3% of all TBIs. However, the National Institute of Neurological Disorders and Stroke (2010) reported that half of all TBIs are the result of MVAs which has been the leading cause among individuals under 75 years old, whereas falls are the leading cause in individuals 75 years or older. The CDC (2010) reported that MVAs were responsible, however, for the largest percentage of TBI related deaths in the United States. According to the National Institute of Neurological Disorders and Stroke (2010), 20% of TBIs are due to violent acts such as firearm assault or abuse, and approximately 91% of TBIs from

firearm assault result in death. However, the CDC found that only 10% of TBIs were caused by violence. Despite discrepancies in etiology, the CDC and National Institute of Neurological Disorders and Stroke have concurred that more than half of TBIs result from an event involving alcohol.

Similar to the National Institute of Neurological Disorders and Stroke (2010) findings, Kendall and Terry (2009) found that the leading cause of their subjects' injuries was MVAs (68%), and falls and assaults causing 16%. Baguley, Cooper, and Felmingham (2006) also found similar statistics with causes of brain injury including: MVAs (66%), falls (17%), assault (12%), and sports or other causes (5%). Ownsworth and Fleming (2005) reported that 46% of their subjects' brain injuries were caused by MVAs, 7.5% caused by falls, 6% resulted from sports accidents, 4% resulted from work-related injuries, and 3% from assault. In terms of young adults, it does appear from our research that motor vehicle accidents were the most common mechanism of TBI which is a highly relevant finding for this scholarly project of which the focus is young adults. Further evidence did highlight the extent to which young adults comprised the population of people with TBIs.

Age

According to the National Institute of Neurological Disorders and Stroke (2010), the core age groups at risk for sustaining a TBI include children 5 years and younger, elderly adults ages 75 years and older, young adults ages 15-24 years, and, more specifically, male adolescents. The CDC (2010) provided similar statistics such as infants to children age 5 years, adolescents 15-19 years old, and adults who are 65 years or older. The age-related demographics reports of the CDC and National Institute of Neurological Disorders and Stroke were supported and congruent with existing research studies that were reviewed for this scholarly project. Keung Yuen (1997)

completed a case study on a man who was 43 years old and survived his TBI at 23 years old. Research by Kendell and Terry (2009) and Ownsworth and Fleming (2005) included participants from either 16-63 years old or 16-65 years old. Another case study completed by Fluharty and Classman (2001) involved a 23 year-old male, similar to the mean age of 28 years of participants in research by Giuffrida, Demery, Reyes, Lebowitz, and Hanlon (2009).

Age does have clinical implications that are relevant for occupational therapy practice though, notably, incongruencies exist in terms of recovery. For example, Baguley et al. (2006) found that those patients who were younger at the time of their injury were more likely to show aggressive behavior; whereas, Hukkelhoven et al. (2003) reported that an increasing age is regularly associated with a limited outcome after TBI. Further examination of persons with TBIs return to function will be examined in subsequent sections of this chapter. First, however, it is important to understand the functioning of a non-injured brain.

Function of the Non-Injured Brain

In order to understand symptoms that evolve following a TBI, one must understand the many functions a healthy brain serves. The following content is comprised of a brief overview to familiarize the reader with major functions of the brain. According to Kawczynski Pasch (2005), the brain is divided into sections called lobes and includes the frontal lobe, temporal lobe, parietal lobe, occipital lobe, cerebellum, and the brain stem. The frontal lobe has the largest responsibility of cognitive functions including attention and concentration, self-monitoring, organization, expressive language, motor planning and initiation, self-awareness, personality, mental flexibility, behavior inhibition, emotions, problem solving, planning, and judgment (Kawczynski Pasch, 2005). The temporal lobe is responsible for memory, receptive language, sequencing, hearing, and organization (Kawczynski Pasch, 2005). The parietal lobe is

responsible for sense of touch, spatial perception, identification of size, shape, and color, and visual perception (Kawczynski Pasch, 2005). The occipital lobe's main responsibility is vision; whereas, the cerebellum focuses on balance, skilled motor activity, coordination, and visual perception (Kawczynski Pasch, 2005). The brain stem has arguably the most important of all functions including breathing, arousal and consciousness, attention and concentration, heart rate, and the sleep and wake cycles (Carroll & Curtis, 2005).

Brain injury symptoms brought on by TBI are dependent upon the extent of damage to the brain in whether the injury is considered mild, moderate, or severe. According to the National Institute of Neurological Disorders and Stroke (2010), individuals sustaining a mild brain injury may experience a brief loss of consciousness, though this does not always occur. The individual may feel confused, struggle with headaches, lightheadedness, dizziness, blurred vision, ringing in the ears, fatigue, irregular sleep patterns, poor memory, concentration attention and thinking (National Institute of Neurological Disorders and Stroke, 2010). Book (2005) also wrote that mild traumatic brain injuries (TBIs) most commonly cause a momentary loss of consciousness and possibly a concussion leading to post-concussion syndrome, which includes symptoms such as headaches, irritability, insomnia, and poor concentration and memory.

Moderate brain injuries are usually characterized by a longer period of unconsciousness, small hemorrhages and swelling in the brain tissue (Book, 2005). Most often contusions occur in the temporal or frontal lobes leading to further cognitive and motor deficits (Book, 2005). Though moderate brain injuries are often serious enough to show on a Computed Tomography (CT) scan, severe brain injuries often cause the individual to be put into a deeper level of naturally occurring coma. Damage to the brain after a severe injury is usually instantaneous and irreversible due to the forces that cause diffuse axonal injury, disruption of blood vessels, and

tissue damage (Book, 2005). Other symptoms of moderate to severe brain injuries have been provided from the National Institute of Neurological Disorders and Stroke (2010). Often individuals have severe headaches that do not disappear, consistent vomiting or nausea, convulsions, inability to wake up from sleep, dilation of pupils, slurred speech, extremity weakness, coordination deficits, increased confusion, restlessness and agitation (National Institute of Neurological Disorders and Stroke, 2010).

The aforementioned symptoms that one may experience following a traumatic brain injury are but a summary of the areas of functioning that may be affected. To further explore the functional deficits associated with a TBI, we have applied the *Occupational Therapy Practice Framework: Domain & Process – 2nd edition* (AOTA, 2008) to assist in organizing the breadth of areas of functioning that are influenced by the presence of a brain injury. This document is "an official document of the American Occupational Therapy Association" (p. 625) and used to organize and describe how occupational therapists view and use occupation to understand people and promote health and wellness of individuals and groups of individuals.

Motor and Praxis Skills/Sensory Perceptual Skills

Motor and praxis skills as defined by Fisher (2006), Liepmann (1920), and Heilman and Rothi (1993) in the Occupational Therapy Practice Framework: Domain and Process 2nd Edition as:

> *Motor*: Actions or behaviors a client uses to move and physically interact with tasks, objects, contexts, and environments. This includes planning, sequencing and executing new and novel movements (AOTA, 2008, p. 640).
>
> *Praxis*: Skilled purposeful movements used to carry out sequential motor acts as part of an overall plan rather than individual acts (AOTA, 2008, p. 640).

As with all injuries, there are often many realms of impairments included with the injury whether it is physical, emotional, or cognitive. We sought to explore the physical deficits first because the physical impairments are often the areas focused on most either initially or further on in recovery. These impairments have often been considered the deficits that can be corrected more quickly through medications, surgery or other rehab interventions. One of the most common post-injury complications following brain damage includes immediate seizures (National Institute of Neurological Disorders and Stroke, 2010). Seizures of this nature occur within the first 24 hours of injury and often increase the risk of further seizures occurring one-week post injury (National Institute of Neurological Disorders and Stroke, 2010). Hydrocephalus may occur when cerebrospinal fluid (CSF) gathers in the brain causing dilation of the cerebral ventricles and a boost in intracranial pressure (ICP) (National Institute of Neurological Disorders and Stroke, 2010). Hydrocephalus does not always occur directly following the injury; it may take up to a year to develop but has been characterized by decreased neurological functioning, behavioral changes, ataxia, and signs of elevated ICP (National Institute of Neurological Disorders and Stroke, 2010). Pain is often the most common physical deficit brought on by brain injuries. Headaches are the most common form of pain experienced, followed by complications such as bed/pressure sores of the skin, recurrent bladder infections, pneumonia or other infections, and organ failure (National Institute of Neurological Disorders and Stroke, 2010). Polytrauma is often the result of multiple complications such as pulmonary dysfunction, cardiovascular dysfunction, gastrointestinal dysfunction, hormonal irregularities, and multiple fractures (National Institute of Neurological Disorders and Stroke, 2010).

Other physical impairments have been found to impact motor planning/control. As stated previously, the cerebellum focuses on balance, skilled motor activity, and coordination; whereas,

the brain stem is responsible for breathing, arousal and consciousness, heart rate, and the sleep and wake cycles (Carroll & Curtis, 2005). Any of these areas are affected when the brain is injured. Hoofien, Gilboa, Vakil, and Donovick (2001) studied behavior, cognition, social functioning, self-care activities, and general life scenarios with 76 participants who had sustained a TBI, and found that manual speed and dexterity were severely compromised as found through using the Purdue Peg-Board assessment. VanDyck and Mukand (2004) examined the challenge, prevalence, and complications contractures present when coupled with a TBI. Contractures are found to decrease active and passive range of motion (AROM and PROM) thereby decreasing independence in self-care activities such as grooming, feeding, dressing, etc. (VanDyck & Mukand, 2004). These authors associated a TBI with a rapid onset of spasticity due to damage of the upper motor neurons. As a large percentage of the research existing on brain injuries focuses on psychosocial aspects of brain injury, it is important to point out the physical impairments as well, because simply, no matter what setting occupational therapists work in, they will all see both physical and psychosocial aspects of brain injury throughout their career.

Cognitive Skills

According to the Rancho Los Amigos National Rehabilitation Center (1990), the Rancho Levels of Cognitive Functioning is an evaluation tool used by health care team members in order to discover the stage of recovery of the patient. Levels one and two represent the patient being significantly limited in all areas requiring total assistance both physically and cognitively (Rancho Los Amigos National Rehabilitation Center, 1990). When the patient reaches a level three on the scale, he or she still requires total assistance, though responds more often to outside stimuli (Rancho Los Amigos National Rehabilitation Center, 1990). Cognitively, patients at levels three through six require maximal to moderate assistance in performing tasks (Rancho Los

Amigos National Rehabilitation Center, 1990). Reasoning in these patients, along with memory, problem-solving, attention, concentration, planning, organizing, sequencing, judgment, and impulse control are all greatly affected (Rancho Los Amigos National Rehabilitation Center, 1990). The cognitive dysfunction that may be experienced by persons who have sustained a TBI have strong effects on their ability to engage in daily life occupations. When considering the Rancho Levels of Cognitive Functioning, one can draw inferences about daily functional ability of the individual based on his or her score on the Rancho Levels of Cognitive Functioning evaluation. A person who has been assigned a level three may have slower reaction time or the ability to only follow simple directions. A person at level four may have poor attention or concentration, and difficulty following directions. A person functioning at a level five may have a decreased attention span, may be disoriented to what the date is, where he/she is, or why he/she is in the hospital, and may have a poor memory only remembering past events occurring prior to the accident better than his/her daily routines and what he/she has been told since the accident. Finally, a person at level 6 may have the most difficulty with memory, concentrating and paying attention for longer than 30 seconds (Rancho Los Amigos National Rehabilitation Center, 1990).

Functional experiences of persons with TBIs have been studied and correlated with the functional abilities and dysfunction previously described. Fluharty and Classman (2001) provided a case study involving a 23-year old male who sustained a TBI in a MVA. While the man was in a neurobehavioral program, he presented with disorientation, poor listening skills, and limitations in following directions. Handel, Ovitt, Spiro, and Rao (2007) studied an older individual who was also in an MVA sustaining a severe TBI. Prior to the accident, the patient had a full time job while still playing the role as a husband, and participated in many leisure activities. After the injury, the patient spent 2 weeks in a local hospital followed by a 13-day

medically induced coma. Another 10 days were spent in a rehabilitation center. A year following the accident, the patient attempted returning to work, in which he had difficulty with following directions and completing multi-step tasks. Upon evaluation and neuropsychological tests following increased symptoms, the patient was found to have significantly low percentiles in conceptualizing abstract material, word production, and memory (Handel et al., 2007). Many researchers (Handel et al., 2007; Keung Yuen, 1997) have agreed that it is common for cognitive symptoms to worsen, or at least become more visible in later periods following the injury. Rao and Lyketsos (2000) recommended cognitive deficits being placed into stages as to when they occur on the brain injury timeline. Researchers (Rao & Lyketsos, 2000) have indicated the first stage is that of loss of consciousness or coma which occurs directly after the injury. The second stage often presents as a combination of cognitive and behavioral deficits such as inability to recall events, sequence time, and follow through with new learning (Rao & Lyketsos, 2000). These first two stages can last from a few days to one month and are called posttraumatic delirium (Rao & Lyketsos, 2000). Following the first two stages is a 6 to 12-month period of rapid cognitive recovery and then a 12 to 24-month period of plateauing recovery (Rao & Lyketsos, 2000). Rao and Lyketsos reported that in this fourth phase, there are problems with speed of information processing, attention, short and long term memory, problems with executive functioning and mental inflexibility. This last phase is referred to as dementia due to head trauma (Rao and Lyketsos, 2000).

Other researchers have found similar deficits in cognition appearing later in life with individuals sustaining brain injuries. Keung Yuen (1997) provided a case report on a 43-year old man who had sustained the injury 20 years prior. The man had sustained frontal lobe damage leading to difficulty initiating conversation, word finding, and slow information processing. As

identified previously the frontal lobe is responsible for attention and concentration, self-monitoring, organization, expressive language, motor planning and initiation, self-awareness, personality, mental flexibility, behavior inhibition, emotions, problem solving, planning, and judgment (Kawczynski Pasch, 2005). All of these areas contributed to the 43-year old man's ability to answer only simple questions (Keung Yuen, 1997).

Sensory Perceptual Skills

Another area that the Rancho Los Amigos National Rehabilitation Center (1990) focuses on when placing patients into different stages is reaction to stimulation, or sensation. In the first three levels, patients usually demonstrate deficits responding to different stimuli (auditory, tactile, olfactory, or visual). As stated previously, the National Institute of Neurological Disorders and Stroke (2010) reported that often symptoms of mild TBI include blurred vision, ringing in the ears, and bad taste in the mouth. Fluharty and Classman (2001) found that their 23-year old subject presented with tactile defensiveness, a common sensation deficit experienced by patients with brain injuries. A great deal of the evidence we examined was focused highly on communication, cognitive, and social characteristics experienced, though this is an area that may lead to difficulty controlling other behaviors such as verbal outbursts and social inappropriateness.

Communication and Social Skills

Other performance skills that are often impaired in persons sustaining a TBI are *communication and social skills* (AOTA, 2008, p. 628) which include language. Kawczynski Pasch (2005) asserted that injury to the temporal lobe may cause deficits with receptive language (or understanding what is being said), and injury to the frontal lobe may result in deficits with expressive language (speaking). Fluharty and Classman (2001) found that the 23-year old man

with whom they worked demonstrated passivity and poor listening skills. Similarly, Keung Yuen (1997) studied the man who had injured his frontal lobe 20 years prior and expressed himself in a negative and sarcastic manner and did not take initiative to begin conversation or socialize with others. His word-finding was limited as well. According to the Rancho Los Amigos National Rehabilitation Center (1990), individuals at level four demonstrate verbalizations which are often incoherent or inappropriate with the context of the environment. Individuals at level five often require external structure and cues in order to respond to simple commands and converse on social, automatic levels (Rancho Los Amigos National Rehabilitation Center, 1990).

Emotional Regulation Skills

Perhaps one of the most apparent and devastating effects of sustaining a brain injury falls under the category of emotional/behavioral symptomology. One of the most famous TBI patients in the history of medicine was Phineas Gage (Twomey, 2010). Twomey (2010) described Gage as likely one of the greatest examples illustrating behavioral changes following brain injury, and the following content is a synopsis of that description. In 1848, Gage, 25-years old, was a railway construction foreman in Vermont working with explosive powder and a tamping iron when a spark caused an explosion that forced the three-foot long rod through his head. The rod penetrated his skull, shot through Gage's brain and exited the skull by his temple. Despite the extent of the injury, Gage survived. John Martyn Harlow was the physician who treated Gage, and reported that he was not the man his friends knew him as prior to the accident. Before the injury, friends said Gage was quiet and mild mannered. Harlow reported following the injury, Gage's behavior changed dramatically. Gage could no longer "stick to plans," acted with obscenity in public, and displayed little respect to his friends. When his job would not employ

him following the displays of his hideous behavior, Gage eventually joined family in California where he died due to seizures at the age of 36 years (Twomey, 2010).

As mentioned previously, behavioral and emotional changes are almost definite following a brain injury. The frontal lobe, which is the largest section of the brain, is responsible for characteristics such as self-monitoring, self-awareness, personality, mental flexibility, behavior inhibition, emotions, and judgment (Kawczynski Pasch, 2005). All of these characteristics come into play with emotion and behavior. Therefore, it is not surprising that regulating emotions and behavior is strongly affected with a brain injury.

Not only can emotion and behavior be affected directly following injury, but the effects can surface years after the injury. The 58-year old man, studied by Handel et al. (2007), attempted to return to work a year following the MVA that left him with a brain injury. Behavior changes were noticed, and following studies, he was found to have lost interest in most of his previous leisure activities, displayed low motivation, feelings of worthlessness, was unable to make decisions, and demonstrated a depressed mood. At the time, the patient was diagnosed with major depression and recommended to be seen inpatient for treatment; however, the patient and his wife chose to return home. While at home, even more drastic behaviors began to surface as the man became interested in pornography, displayed over-enthusiastic behaviors, and demonstrated social inappropriateness (Handel et al., 2007).

Similarly, Hoofien et al. (2001) conducted a study to measure behavior along with other characteristics in 76 participants who sustained a severe traumatic brain injury. Multiple assessments were used to seek out information from these individuals. Results showed that participants demonstrated hostility, depression, anxiety, psychotics, paranoia, and poor interpersonal skills. Family members discussed the impact of these characteristics stating that

relationships were strained, and many of them felt symptoms of anxiety and depression themselves (Hoofien et al. 2007). Often, family members and friends are the emotional supports and caregivers for individuals who sustained brain injuries. Often, these individuals have extreme difficulty with community reintegration, such as going back to work, due to behavioral and psychosocial issues. Authors, Feeney et al. (2001) described different behaviors had by patients involved in the Wildwood Behavioral Resource Project (WBRP) in New York. Behaviors included agitation, verbal abuse, wandering, manipulation, aggression, sexual acting out, irritability, disinhibition, and extreme dependence on others. As stated in the aforementioned literature, Keung Yuen (1997) wrote about a man who had been injured 20 years earlier but who now expressed himself in a negative and sarcastic manner towards others, displaying rude and demeaning behavior.

Rao and Lyketsos (2000) provided valuable information regarding these behaviors. These researchers reported that 25% of patients with TBIs experience major depression following injury. Feelings of loss, fatigue, irritability, disinterest, and insomnia are experienced by many individuals six months to two years after the injury. Experiencing mania after TBI is less common than depression, though it was still seen in 9% of patients (Rao & Lykestos, 2000). Rao and Lyketsos (2000) observed that mania is more commonly noticed in patients with right hemispheric limbic structure lesions. Mania can include many of the behaviors discussed previously, such as irritability, euphoria, agitation, aggression, or impulsivity, though just because individuals experience these behaviors does not diagnose them with mania (Rao & Lykestos, 2000). Researchers report that a vast array of individuals sustaining TBIs is often likely to experience anxiety disorders as well and write that patients with TBI experience “free-

floating" anxiety characterized by steady worry, nervousness, and fear (Rao & Lykestos, 2000, p. 98).

The idea of whether emotions like anxiety, mania, and depression are regulated with other executive functions and metacognitive skills was examined by researchers, Ownsworth and Fleming (2005). Measures of metacognitive status, emotional status, and executive functioning were completed with 67 individuals who sustained acquired brain injuries. Ownsworth and Fleming (2005) discovered that increased levels of metacognitive skills are associated with increased emotional adjustment and improved performance in areas of executive functioning. Individuals who have hope for the future can better recognize difficulties in performance and strategies. Individuals who had improved idea formation showed increased levels of each metacognitive skill. Individuals with increased depressive symptoms however, were more likely to experience reduced outcomes in psychosocial areas. (Ownsworth & Fleming, 2005)

Negative behavioral symptoms associated with poor emotional regulation most often displayed in patients with brain injury include agitation and aggression. This, of course, is the reason for the creation of this scholarly project. The example provided of Phineas Gage was a prime example; though many researchers have found similar outcomes in persons studied for their brain injuries. As reported previously, Fluharty and Classman (2001) examined the case study of the 23-year old man who sustained a severe TBI after an MVA. This patient was treated at a subacute rehabilitation facility for 14 months until his increasingly combative behavior caused the need to have him placed in a neurobehavioral program. In this program, the patient's behavior ceased to be extinguished through regular therapy measures. The patient displayed threatening behaviors along with high agitation towards staff and residents of the facility. In fact, occasionally this patient would strike staff and other patients causing him to be restrained.

This type of aggression has been noticed by other authors as well. Rao et al. (2009) studied 67 patients who sustained a brain injury in at least the last three months prior to the study. Researchers used the Overt Aggression Scale (OAS) to determine what types of aggression the participants were demonstrating which included: verbal aggression, physical aggression against objects, physical aggression against self and physical aggression against others. The most significant form of aggression experienced by participants was verbal aggression (28.4%). Symptoms of verbal aggression included making loud noises or shouting, yelling mild insults, cursing or making moderate threats, and clear threats of violence towards others or self. Authors observed that physical aggression was highly associated with behavior and legal problems (Rao et al., 2009).

Similarly, Tateno, Jorge, and Robinson (2003) used the OAS to examine aggressive behavior in patients who were all male. Results showed a significant relationship between aggression and patients with TBI. Also, when coupled with major depression, a history of drug or alcohol abuse, or frontal lobe lesions there was a larger correlation between the two (Tateno, Jorge & Robinson, 2003). Persons with TBI may often have corresponding psychiatric conditions like major depression or personality disorders that will increase aggressive symptoms. Authors, Ferguson and Coccaro (2009) tested the hypothesis that a history of mild to moderate TBI was associated with higher rates of aggression and impulsivity. Participants sustaining a TBI were paired with individuals with and without personality disorders to form the comparison groups. The results of the study revealed elevated acts of aggression in both groups; however the group with TBI and personality disorder was twice as high as that of the TBI/no personality disorder group. The same was reported for measuring impulsivity. When behaviors associated with intermittent explosive disorder (IED-IR) were compared to those symptoms of impulsivity

and aggression demonstrated by participants with TBI. Authors asserted that aggression and impulsive behaviors demonstrated by individuals with TBI may present similar but will go beyond behaviors typically seen in IED-IR (Ferguson & Coccaro, 2009).

Aggression can also vary throughout years after injury as well as through groups of people. This is an area that Baguley et al. (2006) studied. Two hundred twenty-eight patients made up the roster of this study and were followed at 6 months, 24 months, and 60 months post discharge. At each of these three follow-up time periods, participants completed assessments looking at psychosocial areas and functional areas. The OAS was completed by participants and/or their significant others. Results showed that verbal aggression was the most common type of aggression displayed. OAS ranges were 0-19 at the six and 24 month intervals and 0-20 at the 60 month time period. Participants were categorized as aggressive or nonaggressive based on their scores. At each time block, 25% of the sample was graded as aggressive; a high rate of the individuals was also at higher levels of aggression. Although the 25% was graded as aggressive, participants did alter back and forth in no given patterns. Another finding from Baguley et al. (2006) correlates with previous studies mentioned, included the predictors of aggressive behavior. Researchers found that depression was the most common predictor at all time blocks; the next most significant association included the age at the time of injury. Those patients who were more depressed or younger at the time of their injury were more likely to show more aggressive behavior (Baguley et al., 2006).

With all of the research completed on the aggressive and agitated behavior displayed by patients with brain injury, there is little provided on how health care workers perceive this behavior. Beaulieu (2007) explored how aggression in patients sustaining brain injuries is perceived by occupational therapists. Participants in this study included occupational therapists

who have worked with adults injured from brain injuries. Results of the study showed that aggression was most likely to take place when patients do not know what to expect, are fearful, frustrated, bothered by close contact, angry, or irritated. Some of the aggressive behaviors reported experienced by therapists included: punching, biting, hitting, throwing objects, invading personal space of others around, shaking fists, or glaring (Beaulieu, 2007). Some of these behaviors do often lead to physical injury experienced by health-care workers. Health-care worker safety is another reason for completing this scholarly project. Stubbs and Alderman (2008) were studying the use of physical interventions (PI) utilized to manage aggressive behaviors in patients as well as whether there were any injuries sustained to patients and healthcare workers during implementation of PI. During the 12-month study period, 1427 incidents were reported where PI techniques were utilized on 75 different patients. An average of 19 incidents occurred per patient. Ninety-four injuries were reported from ninety-two members of the multi-disciplinary team. Stubbs and Alderman (2008) found that rehab assistants were the group who sustained the most injuries (55.4%), which researchers reported that reasoning for this was that this is the group who utilizes PI the most.

Unfortunately effects brought on by acquired or traumatic brain injuries occur at an outstanding rate in the industry of health care mentioned previously. Therefore, it is healthcare workers duty as professionals involved in the health care system to be aware their role.

Role of Occupational Therapy

Assessments

Neuroimaging

Neuroimaging is a noninvasive procedure performed in order to examine the internal structures of the human body. This information can be detected using a Computed Tomography (CT or CAT) scan or Magnetic Resonance Imaging (MRI) (American College of Radiology, 2008). According to the Radiology Society of North America and the American College of Radiology (2008), the findings are then interpreted by healthcare providers in order to co-diagnose and treat medical conditions. Specifically with a TBI, neuroimaging examines the "nature, extent, and location of traumatic lesions" (Tateno, Jorge, & Robinson, 2003, p. 157). These images can be compiled and classified using the Traumatic Coma Data Bank (TCDB) (Kunitz, Gross, Nichols, & Edelstein, 1980). TCDB was designed to compile multiple TBI cases in order to fully manage patient care as well as provide a platform for further research (Kunitz, Gross, Nichols, & Edelstein, 1980).

Medical personnel can more accurately define locations of lesions, muscular tears, or abdominal growth of cells using neuroimaging (American College of Radiology, 2008). Specifically for TBI patients, neuroimaging is useful in diagnosing the severity of the brain injury, therefore allowing healthcare workers to know what areas of the brain are being affected, i.e. frontal cortex, temporal lobe, etc. This in turn provides therapists particularly with an illustration of specific physical or psychiatric dysfunctions that may be evident. Treatment and therapeutic intervention is heavily reliant and guided by neuroimaging.

Neuroimaging used by Tateno et al. (2003) showed that TBI patients who exhibited non-aggressive behaviors had increased rates of a diffuse (or non-specific area of the brain) injury as compared to those patients with a TBI who demonstrated aggressive behavior. This same study allowed the Tateno et al. (2003), using neuroimaging, to conclude that participants with frontal lobe lesions had a significantly increased rate of exhibiting aggressive behaviors. Similarly,

Keung Yuen (1997) found that neuroimaging identified frontal lobe damage in a single case-study patient who had sustained a TBI over 20 years prior to the study. This patient, not surprisingly, demonstrated physical aggression towards others (Keung Yuen, 1997). Using neuroimaging is a first line of defense for healthcare workers to understand and predict likely patient conduct specifically aggression and maladaptive behaviors based on location of injury in the brain.

Cognitive Tests

Cognitive tests are used to examine existing neurocognitive impairments correlating to condition (i.e. TBI) (Giuffrida, Demery, Reyes, Lebowitz, & Hanlon, 2009). Neuropsychological tests (cognitive tests) are performed by professionals to determine a wide range of cognitive performances such as intelligence quotient (IQ), abstract reasoning, attention span, conceptualization, judgment, social reasoning, numerical reasoning, executive functioning, and memory (Handel et al., 2007). Some examples of cognitive assessments used for patients with a TBI are the Wechsler Adult Intelligence Scale-Revised (WAIS-R), Rey Auditory Verbal Learning Scale (AVLT), Wechsler Memory Test (WMS-R), Purdue Peg-Board test, Independent Living Scale (ILS), Cognitive Performance Test (CPT), Cognistat, and Independent Living Scale (ILS) (Hoofien et al., 2000).

In a study by Hoofien et al. (2000), utilization of cognitive assessments proved useful in determining cognitive functioning of patients 10 to 20 years post TBI. Patients with TBI measured at a low-average range through the use of such assessments. Memory was assessed and determined to rank below the 40^{th} percentile. Any form of learning, including verbal learning, in patients 10 to 20 years post TBI fell at the 48^{th} percentile ranking. Other cognitive functioning that fell below the normal values based on age demonstrated similar findings. Patients were

found to have greater difficulty performing tasks involving new information, comprehension, arithmetic, similarities between items, arrangement of pictures, assembly of items from the WAIS-R, digital scanning, digit symbols, picture comprehension, and block design (Hoofien et al., 2000). Engagement in daily occupations such as performing self cares, purchasing groceries, setting up medications, and crossing a busy street to work/school requires cognitive functioning in order to be successful. When impaired, simple daily routines can become impossible to complete. Moreover, when unable to complete such roles, rituals, and routines due to a TBI, a caregiver or healthcare worker must provide care through cueing or performing the task for the patient.

In a case study by Fluharty and Classman (2001), a 23 year old male with TBI (frontal lobe) demonstrated similar cognitive deficits through use of the Galveston Orientation and Amnesia Test and other basic cognitive tasks (i.e. coin identification, sequencing dressing, and stating date and time). The male participant demonstrated disoriented behavior, poor memory, poor attention, difficulty sequencing ideas and body movements with cues. The Mini-Mental State Exam (MMSE) and Wisconsin Card Sorting assessments were utilized by Rao and colleagues (2009) to determine cognitive deficits in 67 patients with TBI. These assessments found similar results to the aforementioned studies. Comparing various patients through a plethora of cognitive assessments in multiple studies paints a group picture of similar cognitive dysfunction and overall disruption of participation in daily activities.

Using the Purdue Peg-Board, Hoofien and colleagues (2001) found severe deficits in manual speed and dexterity in patients with traumatic brain injury 10 to 20 years following initial injury. Dexterity provides the strength and adroitness in order to manipulate objects through use of the hand and/or body such as a using a toothbrush, comb, or eating utensils. Retarding of body

movements in daily tasks such as bathing, dressing, typing, navigating a steering wheel, etc. can cause disruption in a person's life post-injury requiring greater time to complete self cares, finish assignments at work/school, and restricting participation in highly labor-intensive activities are steps that can be taken in order to ensure the safety and success of the person. Coupled with cognitive disruption, the person experiencing these difficulties may not be able to make such decisions independently (Hoofien et al., 2001).

Although multiple selections are available for cognitive testing, the conclusion of many studies point to the same outcome: disarray in various cognitive functions including memory, attention, sequencing, judgment, reasoning, orientation, and executive functioning. These conclusions suggest in fact that it is not the specific assessment used, moreover the cognitive skill to be measured which is more important in assessing and accurate intervention planning of a person who has endured a TBI. Multiple assessments exist, and depending on the region and facility a practitioner resides in, the resources vary greatly.

Overt Aggression Scale

Cognitive assessments are helpful in capturing the functioning of the brain. However, to grasp a holistic picture of a person post brain injury, the Overt Aggression Scale (OAS) is used to understand the patient on an emotional dimension (Rao et al., 2009). The OAS is designed to explore verbal and physical aggressive behaviors (Rao et al., 2009). Through two specific sections, a researcher is able to indentify the type of aggressive behaviors including "verbal, physical against objects, physical against self, and physical against others," (Rao et al., 2009, p. 422). The scale ranges between 0 and 21 with the higher scores representing increased aggression. The second part of the OAS involves interventions provided by staff at the time of

the incident. “The Overt Aggression Scale has been validated in adult and pediatric inpatients with neuropsychiatric illness and violent behavior” (Rao et al., 2009, p. 422).

When the OAS was applied in measuring aggressive behaviors in TBI patients, it proved to be useful in segregating specific behaviors of aggression regardless of various points post injury (Baguley et al., 2006; Rao et al., 2009; Tateno, 2003). The OAS is used to determine severity of aggression as well as hypothesize treatment options (Tateno et al., 2003). With a maximum score of 21, the OAS defines any participant as significantly aggressive when a score of 3 or higher is assigned to a participant on each subtest (Tateno et al., 2003). Information for the OAS is gathered through various vehicles of knowledge on the patient. Data to score the patient on the OAS comes from “the patient, close relatives, nursing staff, and other people who knew the participant well, or from medical records” (Tateno et al., 2003, p. 156).

Used as a primary means to measure aggression’s severity and form, the OAS was used by Baguley et al. (2006) to correlate aggression and TBI. Verbal aggression was found to be the most common type of aggression displayed (Baguley et al., 2006). In fact, Baguley and colleagues (2006) found that 25% of the sample was graded as aggressive; a significant amount of the individuals were also at more severe levels of aggression. Aggression prevalence did not change drastically between a 6 and 24 month period (Baguley et al., 2006). Tateno et al. (2003) however, estimated that the frequency of aggressive behaviors as a whole is much higher. Approximately 11% to 96% of patients demonstrated aggressive behaviors during the acute period of TBI (Tateno et al. 2003). These results were then compared to patients with non-brain injuries. Tateno and colleagues (2003) found that of the patients without TBI, aggressive behavior was found in 11.5% of patients compared to that of 33.7% of patients with a TBI who demonstrated aggressive behaviors.

Agitated Behavioral Scale

Similarly, the Agitated Behavior Scale (ABS) is a scale used by healthcare providers to measure behavioral severity (Beaulieu, Wertheimer, Pickett, Spierre, Schnorbus, Healy et al., 2008). The ABS was originally designed by John Corrigan, a professor in the department of Physical Medicine of Rehabilitation at Ohio State University. Corrigan and colleagues measured the reliability of the ABS with a 208 sample size composed of patients with TBI, dementia, and anoxia (Bogner, Corrigan, Bode & Heinemann, 2000). Corrigan developed the ABS in an effort to measure agitation in the aforementioned populations in order to promote greater success in rehabilitation treatment (Bogner et al., 2000). Measures prior to the development of the ABS were used solely to detect agitation/non-agitation in patients (Beaulieu, Wertheimer, Pickett, Spierre, Schnorbus, Healy et al., 2008).

Through the analysis of the ABS, Bogner et al. (2000) found the assessment to be reliable in providing a measure of agitation across the three different diagnostic groups as well as inter-rater reliability throughout the entire staff. Originally consisting of 39 items in the pool questionnaire, the ABS is now shortened to a 14-item selection to "differentiate agitation, frequency of occurrence, and retention of factors present in the original pool" (Bogner et al., 2000, p. 657). The rankings are from one to four with four being the highest level of degree of which a person demonstrates a specific behavior. Behaviors on the ABS include: attention span, impulsivity, resistance of care, violence, unpredictable anger, self-stimulating behavior, pulling at medical equipment, elopement, restlessness, repetitive behavior, rapid talking patterns, mood irregularity, excesses crying/laughter, and self-abusive behaviors (Bogner et al., 2000). Because agitation is not just one behavior, the ABS is helpful in identifying specific behaviors of each patient so to better prepare healthcare providers and caregivers.

Life History of Aggression Assessment

Besides the ABS, the Life History of Aggression Assessment (LHA) evaluates history of aggression, impulsivity, and general personality traits that interfere with participation in daily activities (Ferguson & Coccaro, 2009). Through this measurement, a healthcare provider is able to create a vision of who the patient is and the types of behaviors associated with him/her. Those participants who had a mild to moderate TBI and prior history of aggression, demonstrated greater rates of aggression following the TBI, compared to the sample of non-TBI patients with prior combative tendencies (Ferguson & Coccaro, 2009). The rates of aggression doubled if the participant was also diagnosed prior to the injury with a personality disorder (Ferguson & Coccaro, 2009).

Interventions

Psychosocial Interventions

When assessments have been completed, interventions begin. There are many forms of interventions for TBI patients. Depending on the nature of the injury, interventions vary greatly. Patients may require one or more forms of physical and psychosocial interventions. The outcome of brain injury analyzed through this literature review has been shown to manifest in the form of various cognitive, behavioral, and physical abnormalities including but not limited to: impulsivity, verbal and physical outbursts, agitation, demanding behavior, impaired sensation, physical impairments, poor memory and sequencing, and confusion. The role of an occupational therapist from a psychosocial aspect is to provide care in order to promote greater independence in daily functions, as well as provide safe coping mechanisms in order to engage in community reintegration.

Likewise, psychosocial interventions can include training for return to work, safety within the home and community, money and/or medication management, community access, emotional regulation and more. Goals of interventions vary on the discipline of the practitioner. Most often, the goals may overlap from profession to profession. For this scholarly project, the authors focus on occupational therapy interventions.

Treatments in psychosocial settings include thinking holistically through the acronym "A-B-C" (Kahlnins & Groft, 2010). The acronym represents a sequential order of outcomes: antecedent, behavior, and consequence (Kahlnins & Groft, 2010). The antecedent is the "before" period of time in which a patient has not yet been stimulated enough to demonstrate a behavior. Should a patient be influenced through stimulation (i.e. a slamming door, being touched, tone of voice, etc.), a behavior soon follows. Depending on the stimulation, the behavior can be positive or negative. For example, being touched may scare a patient causing him/her to demonstrate defensive behavior in the form of hitting the person touching the patient. The consequence for hitting differs, depending on the setting. In a hospital setting, the patient may be placed in restraints or placed in a holding position until the maladaptive behavior diminishes. In the community a person may return the hit, and a fight is now in full swing. Based on the behavior a consequence is merited, again, either positive or negative (Kahlnins & Groft, 2010). The antecedent is the marker for the behavior and ultimately the consequence (Kahlnins & Groft, 2010). Therefore, therapists must supply the stimulation in such a manner that the behavior is predictable, positive, and non-maladaptive. Unlocking this sequence can then impact therapy sessions as well as behaviors outside of therapy (i.e. home, work, school, etc.).

One form of antecedent intervention includes behavior modification. Designed to focus on the problematic behaviors, behavioral modification can range from one-on-one treatment or

group treatment in a therapeutic setting. During a case study, Keung Yuen (1997), used one on one treatment and positive talk training in order to increase cooperation and attention of a 43 year old male had had sustained a TBI 23 years prior to this particular treatment. Despite the large amount of elapsed time from the injury, the male was continuing to demonstrate verbal and physical aggression towards others. The one-on-one occupational therapy sessions focused on modifying statements to be more positive. Following four weeks of therapy, the participant was able to perform positive talking without the use of multiple verbal prompts (Keung Yuen, 1997). Moreover, the positive talk training promoted greater word finding, expansion of social skills, increased independence in emotional regulation, and a heightened quality of life (Keung Yuen, 1997).

Physical modifications to the environment can also affect behavior. Examples of environmental modifications include decreasing stimulations (harsh lighting, brightly colored walls, loud noises), removing physical barriers (furniture, tables, etc.), and providing a safe, positive therapeutic environment (Feeney et al., 2001). In a study by Slifer and Amari (2009), researchers provided environmental modifications, both social and physical, in order to decrease occurrences of unwanted behaviors (i.e. anger, anxiety, etc.). Interventions included operant contingency management interventions, antecedent management interventions, and combined interventions (Slifer & Amari, 2009). Operant contingency management interventions focus on reinforcement, positive or negative, as well as punishment. Something as simple as rewarding the patient with a short break between activities has been shown to have favorable results in reducing tenebrous mood and irritability linked to aggressive behavior (Pace, Dunn, Luiselli, Cochran, & Skowron, 2005).

With reinforcement, therapists desire to increase frequency or probability of the behavior, for example, verbally providing positive compliments for desired behavior such as making the bed each morning. The therapist encourages the positive or desired behavior through reinforcement or reward. With punishment, the opposite is recommended for patients sustaining a brain injury due to its results in unsupportive emotional behavior (Slifer & Amari, 2009). When used correctly, punishment can serve as a suppressant to wayward behavior. In children, use of a "time out" has been shown to significantly reduce self-injurious and aggressive behavior (Pace et al., 2005). The idea behind incorporating a "time out" is to place the aggressive individual in a safe place where the actions are blocked (Pace et al., 2005).

Further recommendations exist for providing reinforcement to dismay inappropriate behavior. Slifer and Amari (2009) described differential reinforcement as providing actions or events in response to behaviors that were to be increased. Using such reinforcement was found to create a calm and supportive environment for patients (Slifer & Amari, 2009). Pace et al. (2005) found that using longer warning times prior to installation of a reinforcement and language modifications (more age-appropriate to participants) were used as antecedent approaches in order to decrease inappropriate behavior.

Antecedent management was also used by Slifer and Amari (2009) for patients with brain injuries. Antecedent management focused solely on environmental modifications both social and physical. These included reducing sensory stimulation, reducing amount of time in therapy or demands required by therapist for self care activities, avoidance of restraints, offering one-on-one staffing with a secure environment, as well as providing access to planners, organizers, or journals (Slifer & Amari, 2009). Aggression is most likely to take place when the patient does not know what to expect, is fearful, frustrated, bothered by close contact, angry, or irritated

(Beaulie, 2007). Placing a daily schedule of a person's appointments, chores, etc. in the room of use is an example of an antecedent approach used in a school setting with a ten-year old boy that reduced self-injurious behavior and aggression (Pace et al., 2005).

Similarly, Feeney et al. (2001) found that antecedent-focused treatments increased community reintegration and decreased maladaptive behaviors including agitation, verbal abuse, wandering, manipulations, aggression, sexual acting out, irritability, disinhibition, and extreme dependence. Poor social functioning is strongly correlated to TBI (Tateno et al., 2003). Moreover, when coupled with a depressive disorder, aggression is more likely to occur (Tateno et al., 2003). Corresponding, participation in antecedent-focused behavioral interventions including social integration, rather than institutionalizing persons with brain injury proved to be cost-effective in the community, saving nearly $125,000 per year for the state of New York where the aforementioned study had been performed (Feeney et al., 2001).

Further physical modifications can include using restraints and medication to manage symptoms when other interventions fail. With proper medications the rate at which healthcare workers resorted to using restraints to manage malevolent behavior decreased (Beaulieu, 2007). Restraints are used as a last resort; instead personnel at healthcare facilities are beginning to teach strategies to healthcare workers that include holds and deep pressure (an antecedent approach) in order to decrease symptoms of aggression. In a study by Stubbs & Alderman (2008), it was found that most outbursts and aggressive incidents lasted less than 10 minutes. Using a system as complicated as maneuvering the patient into restraints and administering medications could very well take up the majority of this 10 minute time frame (by the time the patient is restrained and administered sedative medication, the incident could be internally

resolved). Therefore, using an antecedent model approach rather than use of restraints is highly encouraged (Slifer & Amari, 2009).

Due to the connection of TBI and multiple complex emotional disturbances, medication management is quite meticulous. Common medications used to control aggressive behaviors, agitation, irritability and other symptoms of TBI include: dopaminergics, psychostimulants, serotonin-specific reuptake inhibitors (SSRIs), opiod antagonists, psychostimulants, dextroamphetamine, amantadine, bromocriptine, high-dose betablockers, buspirone, trazodone, and anticonvulsants (Rao & Lyketsos, 2000). Pin pointing behavior and a medication to manage such behavior is a highly sophisticated profession which the physician or psychiatrist is responsible. However, using a holistic approach across each discipline in reporting behaviors in therapy or in the unit of care can assist the doctor prescribing medication in order to appropriately manage behavior so to increase participation in therapies and meaningful activities.

Cognitive Interventions

Cognitive interventions are designed by occupational therapists to be meaningful and functional. Persons who have acquired a brain injury through trauma demonstrate vast cognitive deficits including memory, learning, executive functions, and attention (Giuffrida et al., 2009). Routine tasks of using public transportation to attend appointments can be significantly altered due to the cognitive difficulties a person has post-TBI for example. Giles (2010) found that when adding stress in any of the following: sustained attention, selective attention, alternating attention, and divided attention, the overall functioning improvement is made in that particular area. These promising findings suggest that cognitive skills can be gained through therapeutic intervention. The brain is believed to possess neuroplastic tendencies, which is why new learning

transpires post-TBI. When the intervention is meaningful to the patient, greater therapeutic gains have been shown (Giuffrida et al., 2009).

Working with a patient's own motivation, strengths, and skills to make gains in independence has been shown to be effective (Giles, 2010). Providing a client-centered approach improves both cognitive and functional performance in daily occupations (Giles, 2010). Acquisition, retention, and transfer of skills all improved in a study by Giles (2010) when incorporating random or high contextual interference in typing activities and, therefore, improving overall performance in the task over the control group who practiced blocked or low contextual interference. Although one intervention does not fit all patients, it is important for the therapist to guide interventions through developing rapport with each patient, helping him/her feel in control by allowing decision making where merited, and finding activities that are meaningful. Most importantly, for cognitive interventions, repetition is the critical. TBI patients have been shown to demonstrate greater difficulty in memory and recall when learning unfamiliar skills. Therefore, enhancing learning through similar repetitive activities and allowing practice supports learning in the TBI population (Giuffrida et al., 2009). In summation, providing antecedent-focused psychosocial interventions can help alleviate aggressive tendencies and promote greater success in a therapeutic setting (Giuffrida et al., 2009; Pace et al., 2005; Slifer & Amari, 2009).

Social and Work Interventions

From the perception of an occupational therapist, the ability of a person to independently perform self cares and return to prior function in daily occupations is of the utmost importance. Due to the nature and impact of a TBI, "ability to learn and retain basic personal care skills, instrumental life skills, and work skills (Giuffrida et al., 2009, p. 398)" are all impaired This

provides an occupational therapist with the opportunity to not only provide psychosocial interventions but physical interventions as well. Giuffrida et al. (2009) provided strong evidence to support the idea that therapy focusing on functional and meaningful activities proves to be more successful than that of rote exercise. These interventions can include: social outings, de-escalation exercises, social skills training, role playing, work readiness activities (i.e. typing, resume building, filling out job applications), meal preparation, leisure exploration/participation, work appropriateness (i.e. building rapport with co-workers, work dress attire), and attending support groups. All of these occupational endeavors have been incorporated into therapy and successful in promoting greater function in social and work roles as well as decreasing agitation, impulsivity, and aggression in the TBI population (Feeney et al., 2001; Giuffrida et al., 2009; Tateno et al., 2003; Keung Yuen, 1997).

Physical Disabilities Interventions

Interventions do not stop with psychosocial approaches. Neuromuscular skeletal functions can also be impeded following a TBI. The majority of TBIs occur in falls, motor vehicle accidents, and forms of assault (CDC, 2010). Secondary complications to these types of injuries can result in fractures, weakened muscles, contractures, decreased range of motion (ROM) of upper and lower extremities, limited trunk control, and decreased endurance in daily activities (VanDyck & Mukand, 2004). The combinations of the aforementioned complications lead to a variety of physical interventions to promote rehabilitation gains.

One such intervention includes reducing contracture formation. "TBI is associated with the rapid onset of spasticity as a result of structural damage to the origin or course of upper motor neurons" (VanDyck & Mukand, 2004, p.11). This damage leads to an imbalance of agonist and antagonist muscles, resulting in contractures (VanDyck & Mukand, 2004).

VanDyck and Mukand (2004) described different extremes of contractures including severe rigidity, decorticate rigidity, extensor posturing, or flexor spasticity, all of which can occur in the trunk, or upper and lower extremities. As a result of spasticity and tone, participation in daily occupations including activities of daily living requiring ROM needed to dress, bathe, groom, and feed oneself, are often impeded. Instability in the trunk, upper and/or lower extremities can lead to falls, further contractures, overall muscle weakening, poor sitting posture, and poor alignment in upper and/or lower extremities and trunk (VanDyck & Mukand, 2004).

Interventions for such ailments include, "passive range of motion (PROM), active range of motion (AROM), neurodevelopmental techniques, serial casting, and dynamic splinting" (VanDyck & Mukand, 2004, p.11). Using a patient's daily routines, roles, and habits, a therapist can guide interventions to fit the needs and wants of the patient while providing meaningful activities that, in turn, motivate the patient to achieve therapeutic gains. Interventions to increase the previously mentioned conditions can range from meal preparation/completion, home management (i.e. laundry-cleaning, folding, putting away), dressing, bathing, feeding, grooming, strengthening and stretching exercises, Kinesotaping, balance exercises, activity tolerance tasks, and others (VanDyck & Mukand, 2004; Yasukawa, Patel, & Sisung, 2006). Each occupational therapist differs in the development of a client's plan of care. However, the interventions such carefully coincide with the patient's goals in order to provide the most holistic approach.

Model of Contribution

Authors of this scholarly project intend to provide a continuing education work-shop in order to provide education and application of techniques learned. The target population of this education module consists of health-care workers, including but not limited to the following: nursing, occupational therapists, physical therapists, speech therapists, physicians, rehab aides,

and other health-care staff as well as caregivers who have interaction with patients who have sustained a TBI. Health-care workers will learn techniques consisting of various antecedent approaches to patient care.

According to the workings of Catania (as cited in Dreeben, 2010, p. 180), in order to promote best learning for attendees of the workshop, education principles based on social learning theory (SLT) will be applied in the form of, "(1) consistent repetition of the learned material; (2) a small, progressive sequences of tasks; and (3) continuous positive reinforcement." We believe that in this presentation, learning of the antecedent techniques will be successful using the three foundational blocks of SLT. Reasoning for this is based on adult learning principles as cited in Dreeben.

In conjunction with SLT, the authors will be implementing the constructivist approach to learning. Constructivism is demonstrated by taking mental knowledge had by all participants from previous experiences or learning opportunities and building on that foundation (Dreeben, 2010). Whether a participant has cared for a loved one with TBI for 20 years or an entry-level occupational therapist treating TBI patients for the first time post-schooling, constructivism supports learning in that each participant brings prior knowledge (whether shared or individual) to the workshop. This approach promotes learning of all participants through allowing individual learning to occur regardless of education level.

While using the constructivist approach along with the SLT, we believe that regardless of whether the participant is a health-care worker or a caregiver taking a patient home, he or she will be able to leave this workshop with further knowledge. With the use of multiple visual aids, music, and other teaching tools, we feel secure that all participants will gain a great degree of knowledge through this workshop. Using constructivism and SLT in congruency, the learner can

not only observe modeling and practice of learning, but also connect the information learned to previous knowledge (Dreeben, 2010).

Due to the fact the authors are occupational therapy students and highly educated in theories of occupational therapy, the Model of Human Occupation (MOHO) will be used to address the individuality of the patient and promote greater use of antecedent approaches in application of care. MOHO was developed by Gary Kielhofner in order to provide a holistic approach to persons of different populations requiring various assistance throughout the lifespan (Cole & Tufano, 2008). MOHO encompasses three main parts including volition, habituation, and performance capacity. Volition is the motivation behind participation in the occupation. A person working with a patient who has had a TBI will need to encourage participation in daily occupations by motivating the patient based on their pre-existing volition. Habituation consists of the roles and routine in which an occupation is organized. Incorporating antecedent techniques first most recognizes the importance of using a person's own roles and routines in order to decrease maladaptive behavior that can threaten the well-being of both the person caring for the patient and the patient themselves. Using antecedent techniques in relation to a person's pre-existing roles, routines, and habits goes hand in hand. Performance capacity consists of the motor, process, and communication skills in order to perform a task (Cole & Tufano, 2008). The performance capacity of a person predicts the intervention path for occupational therapists and healthcare workers. Regarding the aforementioned information, participants at this workshop will be provided techniques to provide holistic care to their patients based on MOHO principles.

CHAPTER III

METHODOLOGY

The process which culminated in *Antecedent Techniques Used to Regulate Aggressive Behavior in Patients with Brain Injury: A Teaching Module* has been described in Chapter IV. This module provides education and techniques for the treatment and intervention of negative behaviors associated with brain injury. A comprehensive literature review was conducted to explore and solidify the development of *Antecedent Techniques Used to Regulate Aggressive Behavior in Patients with Brain Injury: A Teaching Module.* This process is further described in subsequent sections of Chapter IV.

This product was designed from the authors' shared passion and interest regarding the treatment and care of individuals who have sustained a brain injury. The authors have both worked in various facilities with this particular patient population and believe in the need for implementation of specific techniques to avert maladaptive behaviors that can pose a risk in interfering with patient care and cause harm to caregivers and therapists. One of the authors attended the American Occupational Therapy Association (AOTA) Annual Conference and Expo to engage and enhance learning in workshops and presentations regarding neurological disorder. Through the education strategies provided in this product, the authors intended to promote overall safety in those involved with patient care and enhance the patient's achievement of goals.

The product was developed with the intention of an audience consisting of healthcare workers and caregivers who work with the population sustaining traumatic brain injuries (TBIs). The authors developed a product that enables learning through observation, modeling, practice, and building skills from previous knowledge. Information regarding the aforementioned learning styles was constructed following a systematic review of adult learning theories. In an attempt to identify pre-existing antecedent workshops that promote similar skills and education on these services provided in *Antecedent Techniques Used to Regulate Aggressive Behavior in Patients with Brain Injury: A Teaching Module*, the authors were unable to isolate any existing information regarding these approaches in the form of a teaching module.

A search for literature was conducted utilizing the PubMed, Cumulative Index to Nursing and Allied Health Literature (CINAHL), Google Scholar, and the Academic Search Premier databases accessed through the Harley E. French Library of the Health Sciences at the University of North Dakota of Medicine and Health Sciences. Literature was also located within the Brain Injury Association of America, National Institute of Neurological Disorder and Stroke, Brain Trauma Foundation, Centers for Disease Control and Prevention (CDC), Radiology Society of North America, American College of Radiology, Ranchos Los Amigos National Rehabilitation Center, and informal communication with a speech pathologist employed at a major healthcare facility in the northern plains.

The literature reviewed by the authors supported their interest and concern regarding existing antecedent studies that involved persons with brain injuries. Based on the existing literature, an outline was formed and categorized based on the following: demographics, etiology, and age of the brain injury population. Further categories included: assessments, interventions including improvement of physical skills, behavioral modifications, cognitive

treatment, social skills training, and support of work re-integration. Topics were divided by authors based on personal interest and knowledge, and a review of the literature was written. Following the initial literature review, a revision was conducted to ensure amalgamation and accuracy of information.

A thorough review of literature was used to guide the development of *Antecedent Techniques Used to Regulate Aggressive Behavior in Patients with Brain Injury: A Teaching Module.* The presentation will consist of a two hour lecture involving the review of literature and education on the TBI population. Following a half-hour break, the presentation will conclude with a one hour implementation session to integrate and rehearse strategies learned in the previous session. Case studies provided by the authors will provide a foundational platform to participants that enable practice sessions to develop skill sets and offer an opportunity to learn and interact from others. At the close of the workshop, participants will be leaving with slide presentations of the morning material.

As the aforementioned information in Chapter II portrayed, two adult learning theories were used when creating Chapter IV. These included the social learning theory (SLT) and constructivism. Through use of constructivism, participants will take previously known knowledge regarding TBIs and build on that foundation with the information provided through the education module (Dreeben, 2010). Learning is equivalent to development. It requires the self-organization and independent thinking on the part of the learner (Fosnot, 2005). Learners should be allowed to raise their own questions, generate ideas, test hypotheses, and discuss them with practice (Fosnot, 2005). Fosnot (2005) also reports that as humans, we need time to reflect and organize our thoughts and learning across experiences. Allowing time for practice as well as reflection regarding previously learned information compared to new ideas is essential to

teaching (Fosnot, 2005). The constructivist theory will be used throughout the educational module with information provided through visual and auditory teaching strategies as well as hands-on strategies used during the application piece of the workshop. SLT, however, is specifically used in the application piece while learners can observe others' behaviors and modeling. Participants will watch either the instructors or other participants and form their own ideas on how behaviors are performed. Following, they use this information learned to guide their own actions (Dreeben, 2010).

As Chapter III reported, *Antecedent Techniques Used to Regulate Aggressive Behavior in Patients with Brain Injury: A Teaching Module* was created following a thorough review of literature using various, credible sources, attendance of workshops on the topic of neurological disorder, and discussion with professionals in this line of work. After gathering all necessary information, the authors formed a presentation of slides to be shown at a workshop as well as case studies to go along with the application piece of the education module. A detailed description and presentation slides of *Antecedent Techniques Used to Regulate Aggressive Behavior in Patients with Brain Injury: A Teaching Module* has been included in Chapter IV.

CHAPTER IV

PRODUCT

Chapter IV is comprised of an overview of the product of this scholarly project, a workshop for those involved in the care of persons who have sustained a traumatic brain injury. The *Antecedent Techniques Used to Regulate Aggressive Behavior in Patients with Brain Injury: A Teaching Module* was created to provide an educational workshop of antecedent techniques for therapists, care givers, healthcare workers, and any other persons who interact on a consistent level with brain injured individuals. This educational workshop is intended to reduce aggressive or maladaptive behaviors presented in individuals who sustain brain injuries through the use of training and a skill building session. The workshop is divided into four sections lasting between 45 minutes and 1 hour each.

The first session of this workshop consists of a literature review on brain injury. During this session, workshop attendees will learn or expand their knowledge of the anatomy/physiology of the brain (i.e. lobes and their responsibilities), etiology of brain injuries as well as risk factors or ages associated with injury, symptomology of brain injuries, and level of severity.

The second session of the educational workshop consists of information regarding the role of occupational therapy in brain injury recovery. During this time, attendees will gain knowledge regarding injury recovery from an occupational therapy standpoint. Both authors attended a Master's Occupational Therapy Program and have experience in assessing and

treating individuals with brain injury. Examples of assessments and intervention are provided in this section.

The third session of the workshop consists of antecedent approaches in brain injury recovery. This session was created based on a thorough review of the existing research studies (of which a dearth of evidence exists) done by various care providers who have worked with the population of individuals sustaining brain injuries. The instructors will provide specific examples of antecedent techniques incorporated within each study presented. This session provides attendees thorough exposure to available literature related to antecedent strategies. In doing so, instructors will illustrate the lack of existing research on this particular area of treatment.

The closing session is comprised of a skill building exercise with case studies provided by instructors. Attendees will be broken into groups in which they will be assigned case studies to read and discuss. Attendees will then be asked to create antecedent techniques through the use of role play, discussion, application of personal experience related to the case study, or any other preferred method to engage in skill building.

In producing *Antecedent Techniques Used to Regulate Aggressive Behavior in Patients with Brain Injury: A Teaching Module*, two adult learning theories were used. These included the Social Learning Theory (SLT) and Constructivism. Through use of Constructivism, participants will take previously gained knowledge regarding TBIs and build new concepts and insights based on the information provided through the education module (Dreeben, 2010). Knowledge is actively constructed as the learner is constantly building upon what he or she knows (Fosnot, 2005). Within this workshop, attendees with previous knowledge on this subject will construct and rebuild upon their foundation of learning. Learners will be encouraged to raise their own questions, generate ideas, test hypotheses, and discuss them with practice (Fosnot,

2005). Allowing time for practice, as well as reflection regarding previously learned information compared to new ideas is essential to teaching (Fosnot, 2005). The constructivist theory will be used throughout the educational module with information provided through visual and auditory teaching strategies as well as hands-on strategies used during the application piece of the workshop.

SLT, however, was used specifically in the application piece as learners observe others' behaviors and modeling during the workshop. Participants will watch either the instructors or other participants and form their own ideas about how behaviors are performed. It is anticipated that they will then use new knowledge information learned to guide their own actions (Dreeben, 2010). This workshop is supported by SLT as each attendee has the opportunity to learn through literature review, discussion, and application as well as various demonstrations of skills learned through the observation of various participants. Constructivism and SLT are used in conjunction to sculpt one's own application of antecedent techniques.

This workshop is intended for the use of planning and incorporating antecedent techniques to reduce aggressive behaviors in the brain injury population. Authors intend for this scholarly project to be presented to various regions of the United States so to spread knowledge regarding antecedent strategies. The workshop content for *Antecedent Techniques Used to Regulate Aggressive Behavior in Patients with Brain Injury: A Teaching Module* are located in Appendix C of this scholarly project.

In Chapter IV, we provided an overview of the product of this scholarly project. Chapter V will present a summary of the purpose and use of the product. It also offers recommendations for future implementation, development and research.

CHAPTER V

SUMMARY

The purpose of this scholarly project was to explore current methods used to minimize dangerous behavioral clients and ultimately provide a teaching module of antecedent techniques - a form of intervention used in order to reduce a behavior (Pace et al., 2005) - to therapists, care givers, healthcare workers, and any other persons who interact on a consistent level with brain injured individuals. A workshop was designed in order to provide foundational groundwork in application of antecedent techniques. Upon review of literature, authors noted vast amounts of information on symptomology of brain injury. Although, literature displayed several examples of utilization of antecedent strategies, it was not clear as to where individuals, whether healthcare workers or family, received the training or information regarding these techniques. While literary authors thoroughly described the behaviors and limitations that may occur following a brain injury, a paucity of educational workshops to educate professionals and caregivers was noted. The teaching module, directed towards the specific population of brain injured individuals, can be related also towards other populations such as individuals with dementia or mental illness while managing aggressive behaviors.

The workshop content serves as both a strength and a weakness. As a strength, the module provides a specific training workshop to attend in order to learn how to utilize these strategies and when the antecedent techniques should be used. While attendees will learn a vast amount of information attending this training session, authors cannot offer their own testimony of using

antecedent techniques with the brain injury population. Instead, they rely on the literature review from studies pertaining to the topic as well as their minimal time in the field to experience these behaviors and strategies regarding antecedent techniques.

In order to improve the content of this teaching module, outcome evaluations will be provided to participants following the conclusion of *Antecedent Techniques Used to Regulate Aggressive Behavior in Patients with Brain Injury: A Teaching Module.* Using the results of the surveys, the authors will modify the workshop as needed to promote best learning of all participants. The workshop can be modified in various ways to fit the intended audience.

Although, authors intend for this teaching module to be used as a stand alone continuing educational workshop, *Antecedent Techniques Used to Regulate Aggressive Behavior in Patients with Brain Injury: A Teaching Module* could also be used in the form of an educational handout for caregivers. Therapists new to a facility may be provided with antecedent training in the form of a handbook using portions of this workshop during the orientation phase.

It is our hope that the participants of this workshop will use these tasks to enhance the daily life of the brain injured individual by applying antecedent techniques on a daily basis, as this will produce harmonization between the patient's wants and needs and the success in daily occupations. In conclusion, by using antecedent techniques, participants will promote success in occupations by decreasing aggressive tendencies in the individual sustaining a brain injury.

APPENDICES

Appendix A

Photography Permission

Photography Permission Statement

Dear Ms. Larson,
Thank you for writing to NIH Info. All of NIH's publications - with very few exceptions - are in the public domain and are freely available for use and re-print. You are welcome to use any materials you feel would be useful in your work; however, we do request that you offer proper attribution as to the source of the material.

Please let us know if we may help you with other information.

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National Institutes of Health
Office of Communications and Public Liaison
9000 Rockville Pike
Bethesda, Maryland 20892

-----Original Message-----
From: mjlarson@medicine.nodak.edu [mailto:mjlarson@medicine.nodak.edu]
Sent: Tuesday, March 22, 2011 5:26 PM
To: NIHInfo (NIH/OD)
Subject: Inquiring about Permission for use of Images

Hello,
I'm Megan Larson from the University of North Dakota School of Medicine and Health Sciences. I'm in my final year of the Occupational Therapy Master's Program and am inquiring regarding permission to use images from your galleries/websites. I am doing a scholarly project on brain injuries which will include a workshop given to healthcare workers and survivors of brain injuries. Images, if given permission to use, will ONLY be used for educational purposes. Thank you for your consideration and have a great day.

Megan Larson

Appendix B

Outcome Evaluation

Assessment of Learning

Please check the appropriate box for which best describes your answer.

What is your role in the life of a brain injured individual?	□ Occupational Therapist □ Healthcare Worker □ Caregiver □ Family Member □ Other If Other_____
What type of learner are you?	□ Auditory Learner □ Hands-on Learner □ Visual Learner □ Unknown □ Combination What combination? _____ _____
After this workshop, do you feel more comfortable interacting with individuals with brain injuries?	□ Yes □ No □ N/A
Do you have a better understanding of the causes of Traumatic Brain Injury (TBI)?	□ Yes □ No □ N/A
Do you have a better understanding of aggression as a prime symptom of TBI?	□ Yes □ No □ N/A
After this workshop, would you be able to recognize signs of aggression or other maladaptive behaviors in a person sustaining a TBI?	□ Yes □ No □ N/A

Following this workshop, do you feel as though you could apply antecedent techniques in various situations with persons with TBI?	□ Yes □ No □ N/A
Was information presented at an appropriate pace?	□ Yes □ No
Did you feel the information provided was relevant and helpful for your practice?	□ Yes □ No □ N/A
Did concepts presented facilitate clinical reasoning skills?	□ Yes □ No
Were visual aids appropriate for the presentation?	□ Yes □ No
Did you feel as though you were able to participate and use your clinical reasoning skills during the case study activity?	□ Yes □ No

Other suggestions/ comments?

_____
_____
_____
_____
_____
_____
_____
_____
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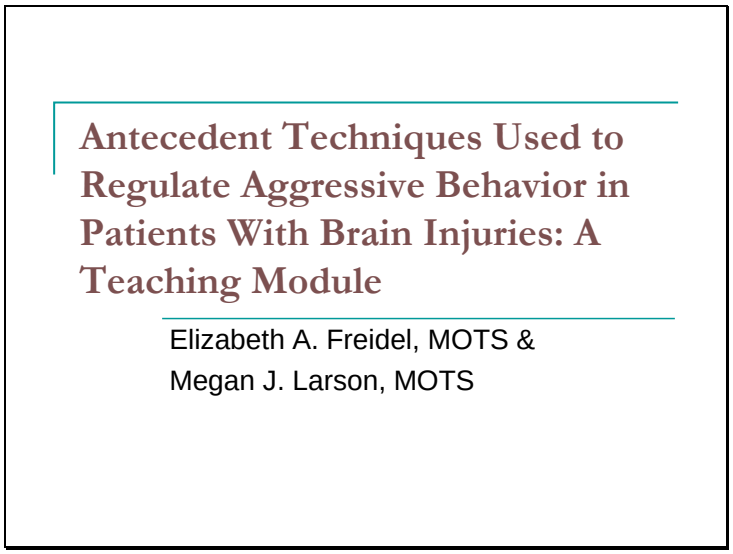
_____

Appendix C

Product

Slide 1



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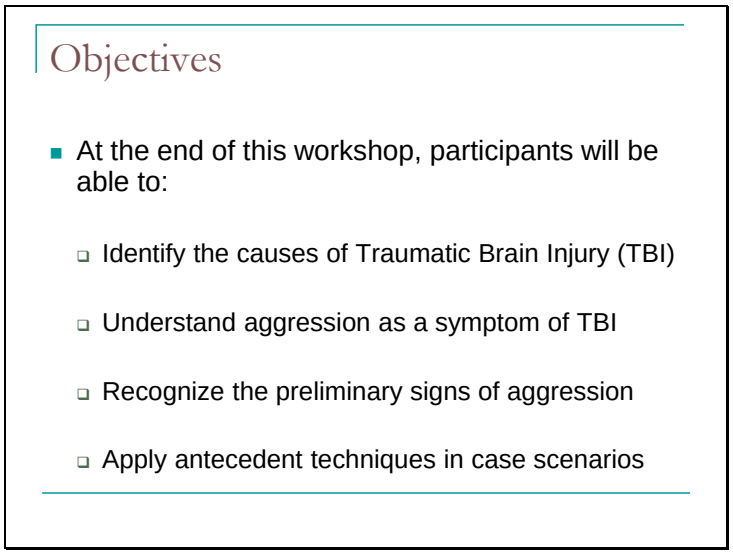


At the end of this workshop, participants will be able to:

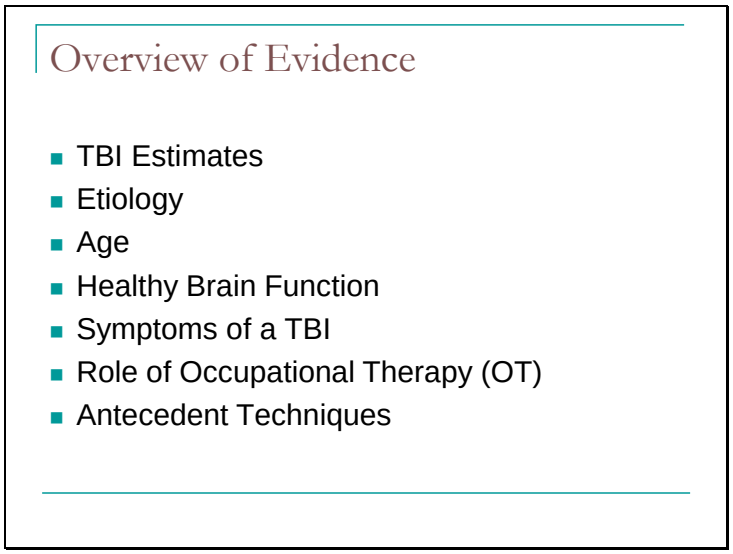
-Identify the common causes of Traumatic Brain Injury (TBI)

-Understand aggression and other emotions/behaviors as a symptom of TBI

-Recognize the preliminary signs of aggression

-Apply antecedent techniques in case scenarios

Slide 3



TBI Estimates and Statistics of injury, hospitalization, and death caused by TBI

Common causes of TBI

Ages most commonly related to occurrences of TBI

Functions of the non-injured brain

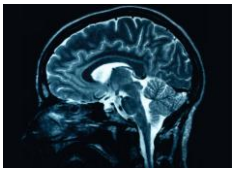
Symptoms brought on by an injured brain

Role of Occupational Therapy (OT) in treatment of a brain injury

Antecedent Techniques used to Reduce Maladaptive Behavior

Slide 4

TBI ESTIMATES/STATISTICS



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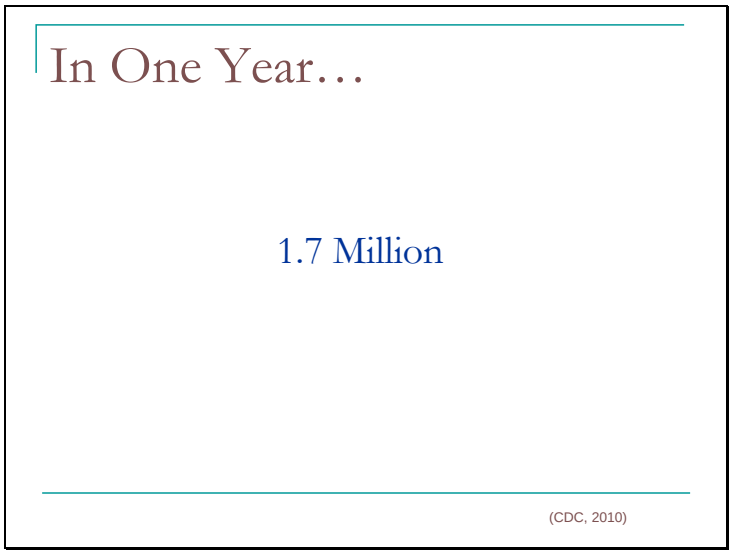
Slide 5



1.7 million people experience a TBI each year (CDC, 2010)

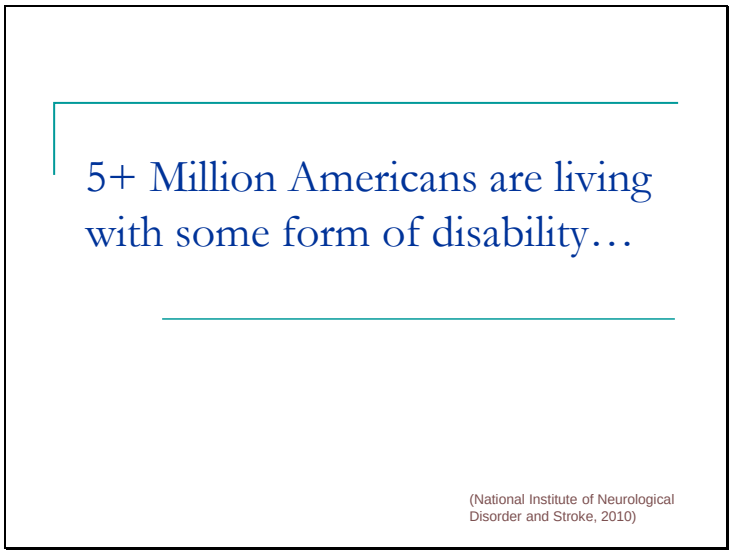
-1.4 million individuals are treated and released from the hospital emergency room

-52,000 people die

-275,000 people are hospitalized for their injury and survive

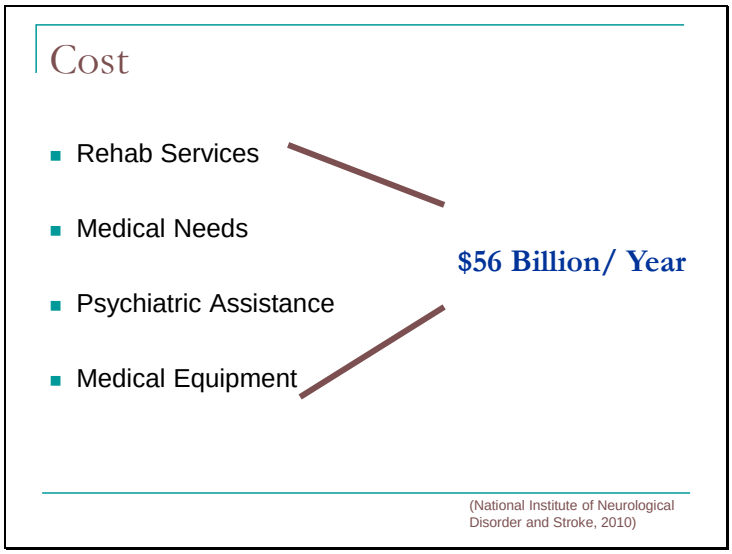
The Brain Trauma Foundation (2010) reported that approximately 1.6 to 3.8 million sports-related TBIs occur each year, and some believe that between 150,000 and 300,000 service members who have been overseas to Iraq have acquired some level of a TBI.

Slide 6



5 million + Americans who have sustained a TBI are living with some form of disability (National Institute of Neurological Disorder and Stroke, 2010)

Slide 7



Brain injuries in the U.S. have a financial impact of greater than $56 billion per year including:

-Rehab services

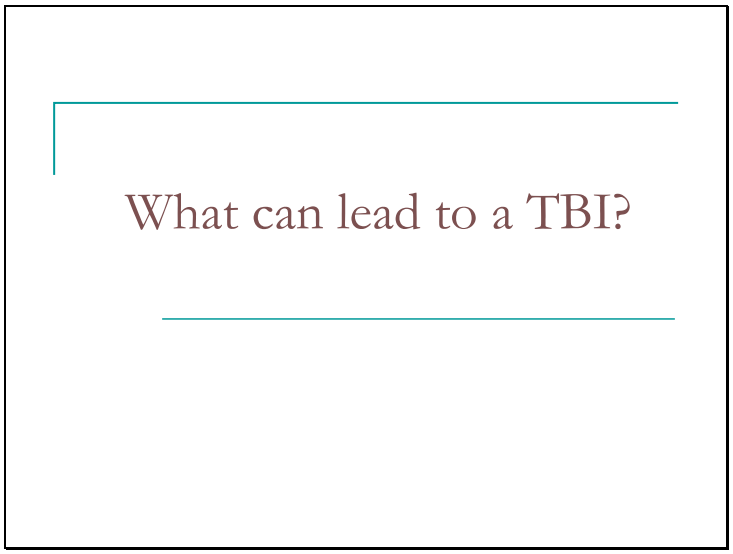
-Medical needs

-Psychiatric assistance

-Medical equipment

(National Institute of Neurological Disorder and Stroke, 2010)

Slide 8



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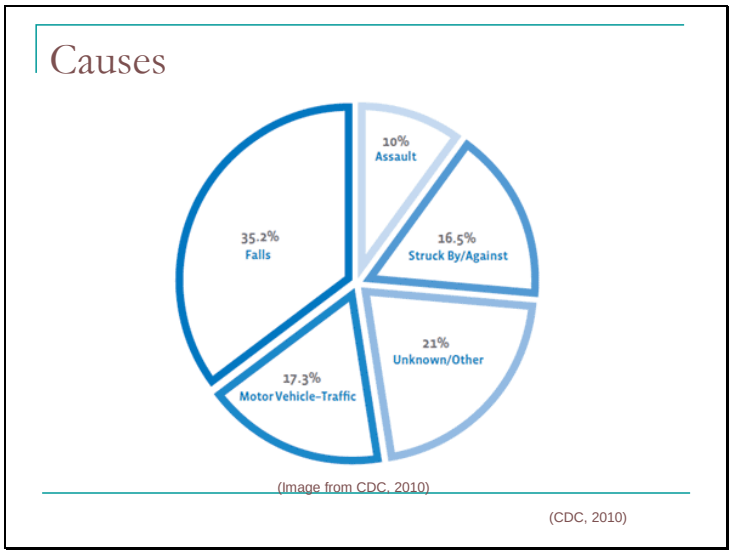


According to the CDC (2010), falls are the leading cause (35.2%) and account for 50% of TBIs among children aged 0-14 years and 61% of all TBIs among adults aged 65 or older. Motor vehicle accidents (MVAs) following at 17.3% of all TBIs.

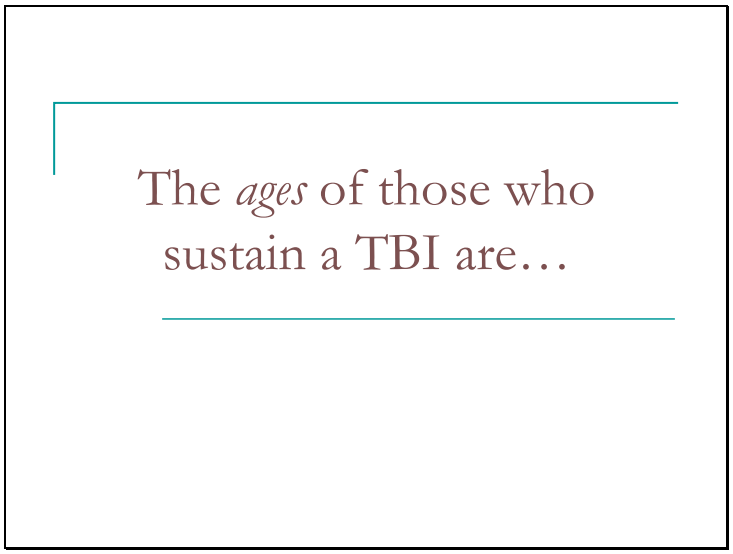
The National Institute of Neurological Disorder and Stroke, however, found that half of all TBIs are the result of MVAs which has been the leading cause among individuals under 75 years old, whereas falls are the leading cause in individuals 75 years or older.

Kendall and Terry (2009) found that the leading cause of their subjects' injuries was MVAs (68%), and falls and assaults causing 16%. Baguley, Cooper, and Felmingham (2006) also found similar statistics with causes of brain injury including: MVAs (66%), falls (17%), assault (12%), and sports or other causes (5%).

In terms of young adults, it does appear from our research that motor vehicle accidents were the most common mechanism of TBI which is a highly relevant finding for this scholarly project of which the focus is young adults.

There are discrepancies in etiology between the CDC and the National Institute of Neurological Disorder and Stroke; however, both find that more than half of TBIs result from an event involving alcohol.

Slide 10



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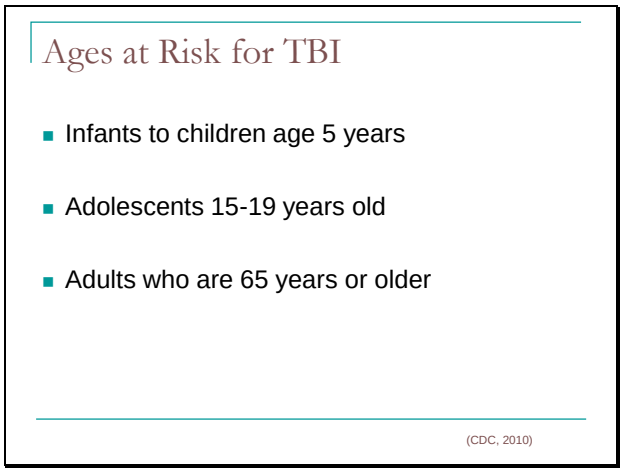


Infants to children age 5 years, adolescents 15-19 years old, and adults who are 65 years or older. (CDC, 2010)

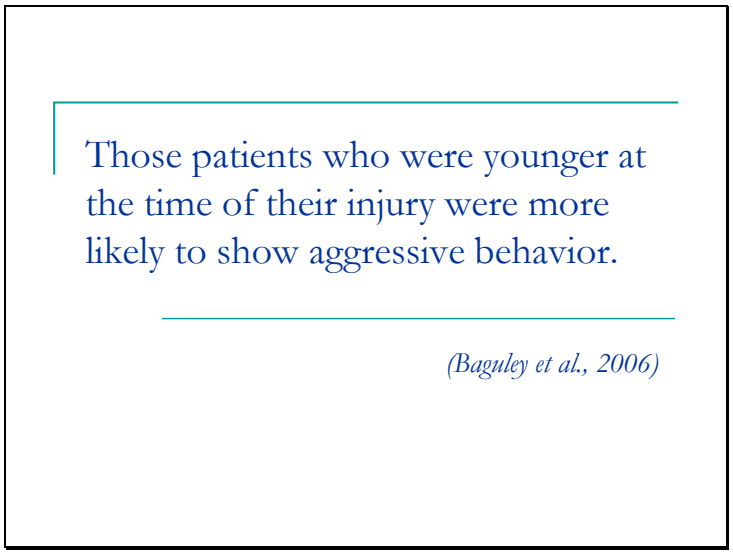
According to the National Institute of Neurological Disorders and Stroke (2010), the core age groups seemingly at risk for sustaining a TBI include children 5 years and younger, elderly adults ages 75 years and older, young adults ages 15-24 years, and, more specifically, male adolescents.

Keung Yuen (1997) completed a case study on a man who was 43 years old and survived his TBI at 23 years old.

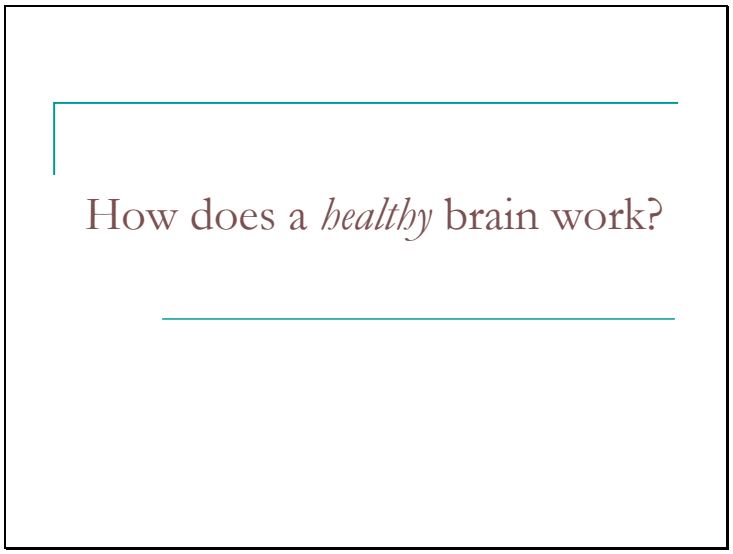
Research by Kendell and Terry (2009) and Ownsworth and Fleming (2005) included participants from either 16-63 years old or 16-65 years old.

Another case study completed by Fluharty and Classman (2001) involved a 23 year-old male, similar to the mean age of 28 years of participants in research by Giuffrida, Demery, Reyes, Lebowitz, and Hanlon (2009).

Slide 12


Those patients who were younger at the time of their injury were more likely to show aggressive behavior.
(Baguley et al., 2006)

Slide 13



Slide 14

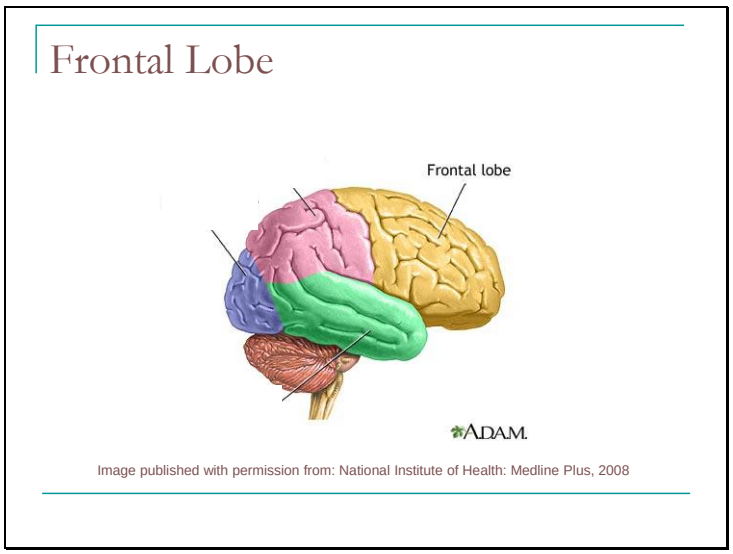
Lobes of the Brain

- The brain is divided into sections called lobes
  - Frontal lobe
  - Temporal lobe
  - Parietal lobe
  - Occipital lobe
  - Cerebellum
  - Brain stem

(Kawczynski Pasch, 2005)

(Microsoft Word 2010 Clip Art)

Slide 15



-Attention and concentration

-Self-monitoring

-Speech Organization

-Expressive language (Broca's Area)

-Motor planning and initiation

-Self-awareness

-Personality

-Mental flexibility

-Abstract vs. Concrete Reasoning

-Behavior inhibition

-Emotional Responses

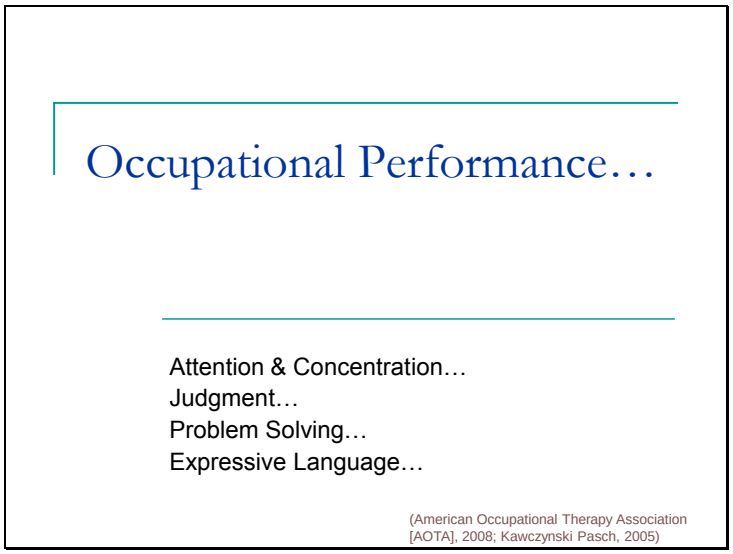
-Problem solving

-Planning

-Judgment (Kawczynski Pasch, 2005)

Image provided by: http://www.nlm.nih.gov/medlineplus/ency/imagepages/9549.htm

Slide 16



Occupational Performance: "the ability to carry out activities of daily life. Includes activities in the areas of occupation: ADL, IADL, education, work, play, leisure, and social participation. Occupational performance is the accomplishment of the selected activity or occupation resulting from the dynamic transaction among the client, the context, and the activity," (AOTA, 2008).

Some areas of occupational performance of which therapists may find affected include the following:

Attention and Concentration allow one to focus on a task, perhaps participate in parallel tasks at one time while dividing and sustaining attention and concentration to each part of the task.
-i.e. When a student is working on a project with another student, and multiple people are around talking and laughing, it is the student's ability to concentrate and attend to the project with distractions going on around.

Judgment allows one to make a decision or to form ideas objectively.

-i.e. Someone's ability to decide safely when to cross the road or put his/her cruise control on depending on the weather.

Problem Solving allows one to solve small or significant problems.

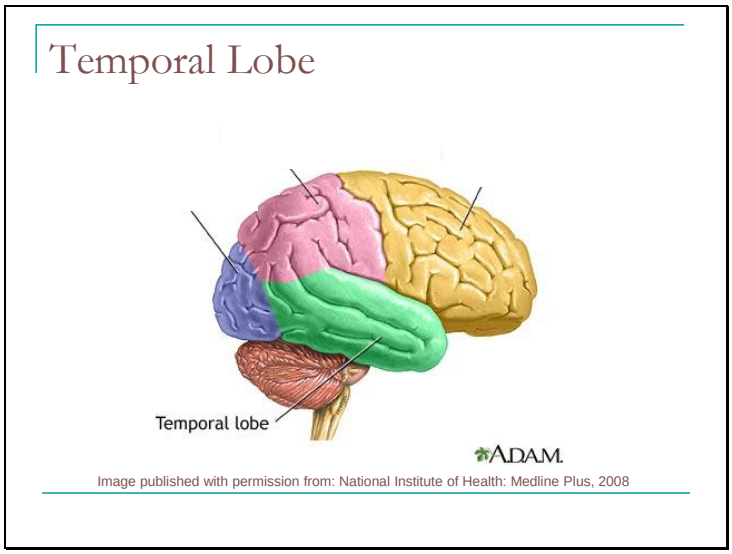
-i.e. Someone may have balanced his/her checkbook wrong, and this person will need to figure out how to make it right. Also, if a person gets lost in the woods, he/she will have to figure out how to make his/her way back to the original point.

Expressive language allows one to get out what he/she needs to say by stating the words he/she is thinking in his/her mind.

-i.e. If a person is able to say what is on his/her mind, he/she is able to express what is being thought whether through facial expression or speaking.

(Kawczynski Pasch, 2005)

Slide 17



Some areas are held responsible by more than one lobe (Frontal and Temporal Lobes coincide frequently)

-Attention

-Motivation

-Memory

-Receptive language

-Sequencing

-Hearing

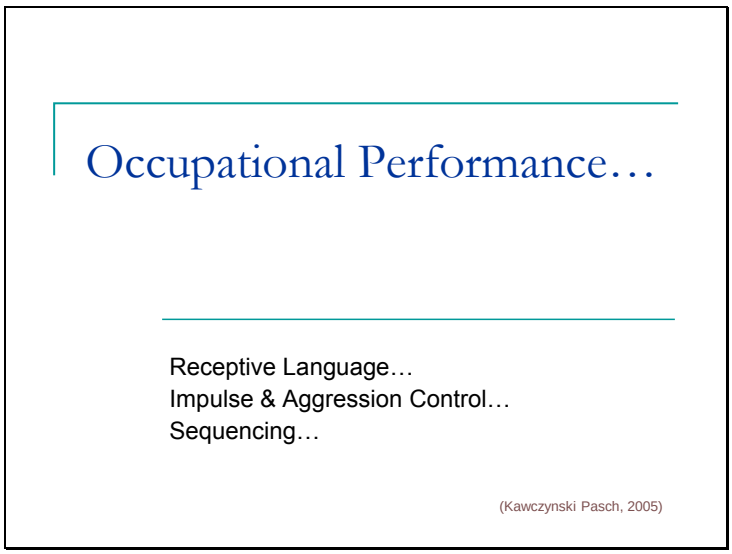
-Organization

-Impulse & Aggression Control/ Behavioral Modulation

(Kawczynski Pasch, 2005)

Image provided by: http://www.nlm.nih.gov/medlineplus/ency/imagepages/9549.htm

Slide 18



Receptive language, which coincides with Wernicke's Area, allows one to understand what is being said to him/her.

-i.e. If 2 people are talking about something, this is the function that allows each of these people to understand what is being said as they are *receiving* the information.

Impulse control allows one to control his/her anger or other emotions and to reduce aggression taken out on others.

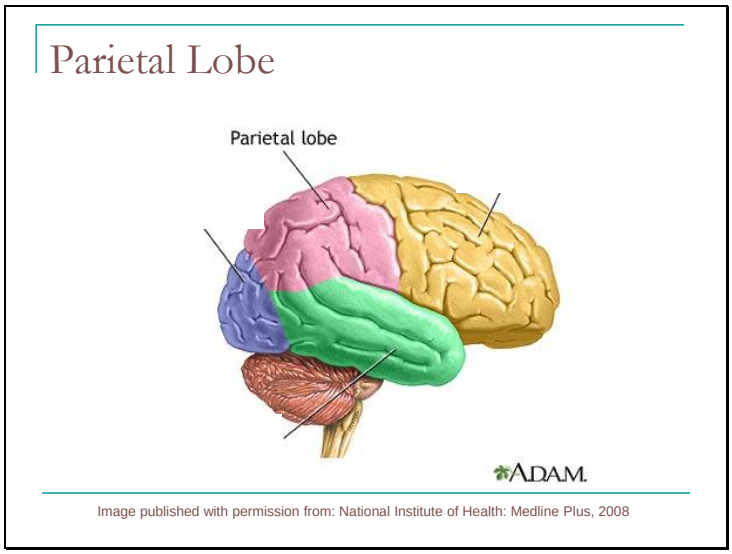
-i.e. If a man is ridiculed and this causes him to be angry, he may want to lash out, yell, or hit the person ridiculing him; however, his impulse control is allowing him to keep those emotions in check and walk away.

Sequencing allows one to perform a task in the correct order. Often this coincides with following directions.

- i.e. If someone is following a recipe to make brownies, he/she is able to use sequencing to recognize what the order is to follow in mixing or adding ingredients and when to turn the stove on, etc.

(Kawczynski Pasch, 2005)

Slide 19



-Sensory integration

-Spatial perception

-Identification of size, shape, and color (Concept Formation)

-Visual perception

-Filtration of Background Stimuli

(Kawczynski Pasch, 2005)

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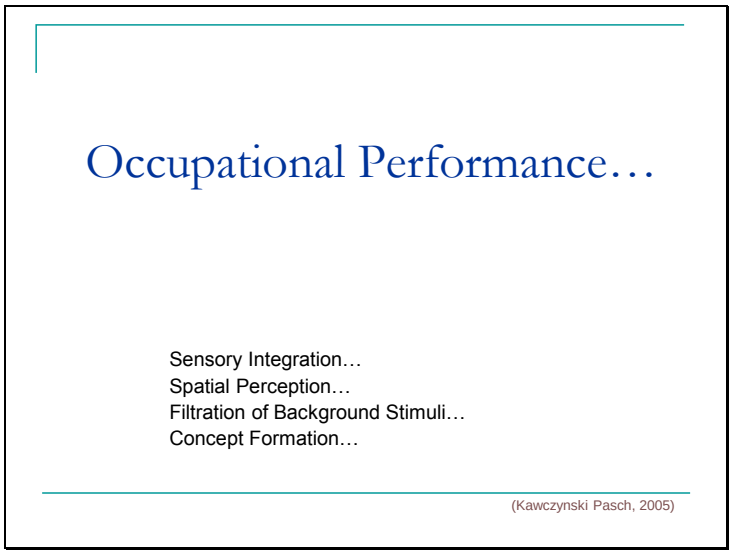
Slide 20



This lobe is essential in the processing and integration of senses such as visual, tactile, and auditory sensations. Sensations are first experienced in the parietal lobe and follow to the frontal lobe where the cognitive part of sensation comes into play.

-i.e. Sensory integration allows a person to feel a knife that is sharp or dull.

Spatial perception allows awareness and the ability to experience one's body in space.

-i.e. When one is performing yoga exercises, it is spatial perception that allows him/her to know where his/her body is in space and preventing him/her from knocking someone over.

Filtration of Background Stimuli allows a person to block extraneous noise and sensations.

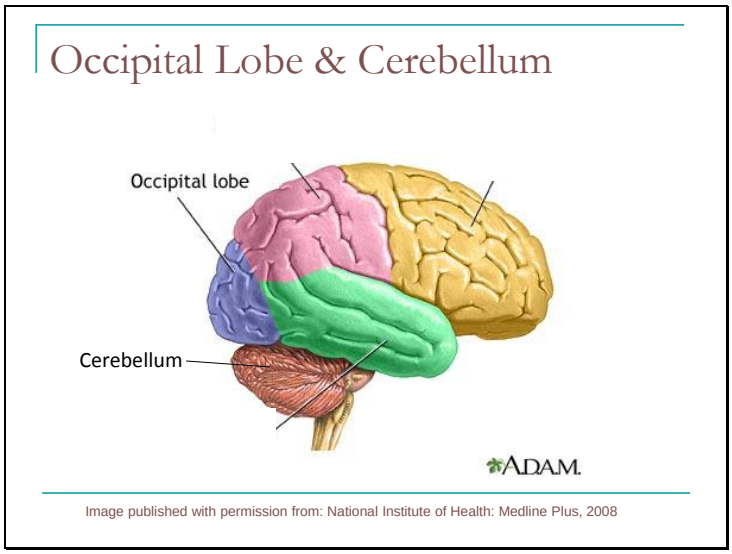
-i.e. A girl sits in a coffee shop working on a paper, and she hears the espresso machine, coffee bean grinder, and individuals everywhere talking. She is able to continue concentrating on her paper because she is able to block out the multiple stimuli in her environment.

Concept Formation allows one to recognize sizes, shapes, and colors of objects.

-i.e. A server is able to distinguish between his pen used to sign the receipt and a knife sitting on a table at a restaurant due to his concept formation.

(Kawczynski Pasch, 2005)

Slide 21



Occipital lobe

-Vision

Cerebellum

-Balance

-Skilled motor activity

-Coordination

-Visual perception

(Kawczynski Pasch, 2005; Carroll & Curtis, 2005)

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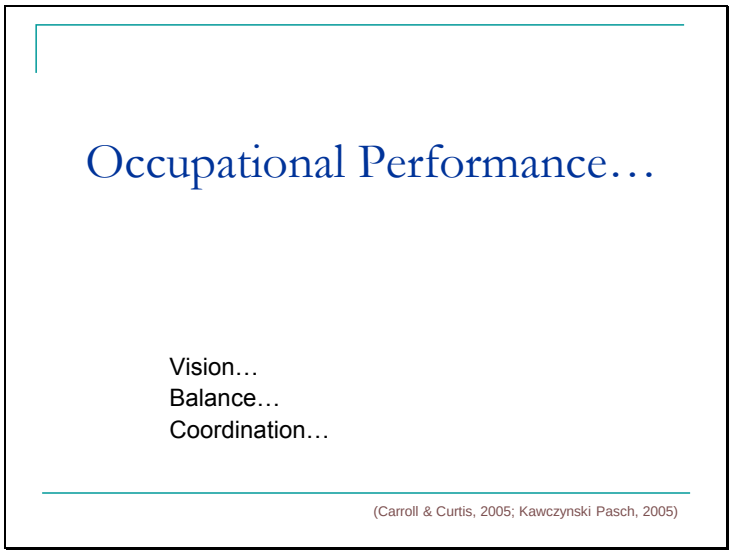
Slide 22



The occipital lobe is responsible for receiving visual information from the eyes and allows for interpretation of visual experiences, including depth perception and location in space.

-i.e. A woman at a restaurant is able to see what is on her menu and read it visually. She is also able to tell how far away the menu is as she is holding it so she does not hit her face.

(Kawczynski Pasch, 2005)

Balance is controlled by the cerebellum and allows one to move either quickly or slowly without falling over. The cerebellum analyzes the moving parts, the speed of the movement and the time course of movement so to inhibit other muscles from getting in the way and ruining the movement.

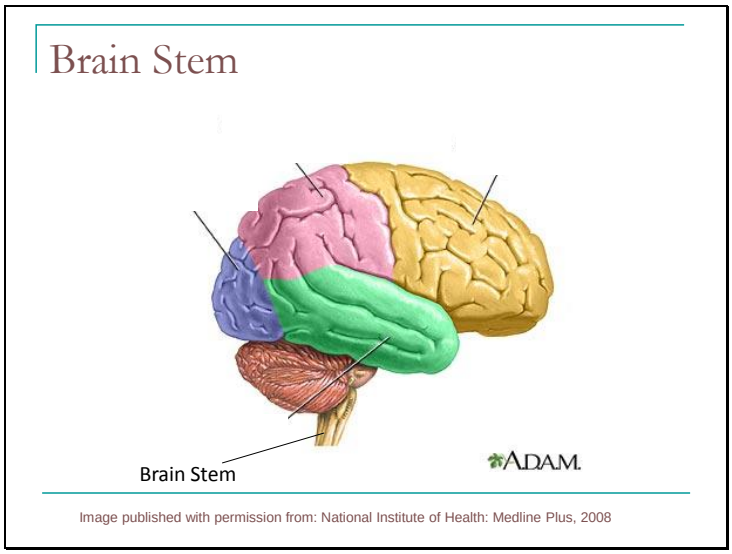
-i.e. A ballerina is able to stand on one foot for an extended period of time without falling due to this function.

Coordination is also controlled by the Cerebellum and allows one to make delicate maneuvers – either gross or fine – requiring extensive motor training.

-i.e. A banker is able to pick up coins off of a table due to the cerebellum controlling the highly skilled movements involved with the fine motor coordination.

(Carroll & Curtis, 2005)

Slide 23



-Breathing

-Arousal and consciousness

-Attention and concentration

-Heart rate

-Sleep and wake cycles

(Carroll & Curtis, 2005)

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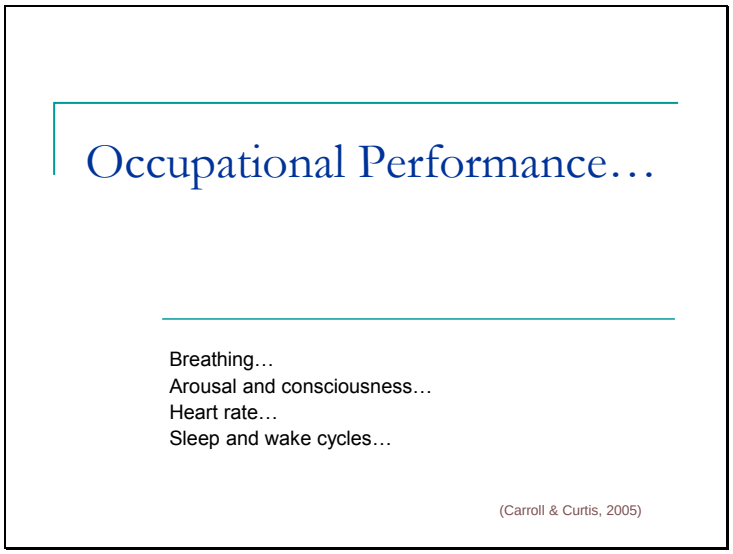
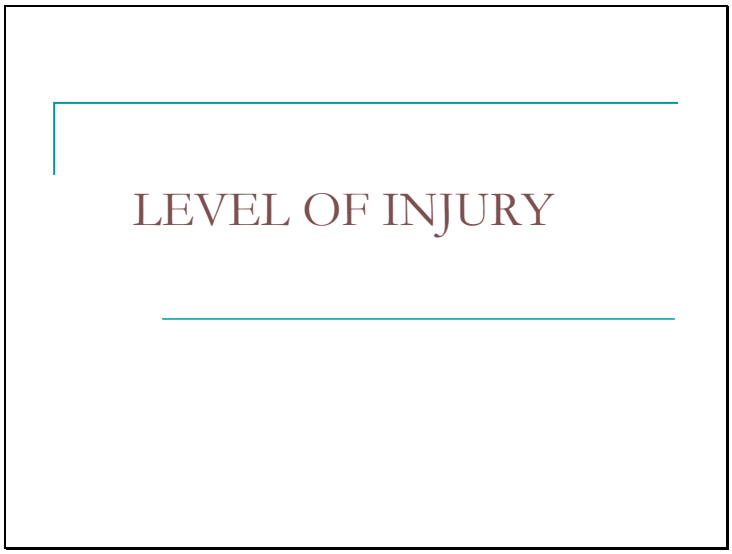
Slide 24



Brain stem has arguably the most important of all functions including breathing, arousal and consciousness, attention and concentration, heart rate, and the sleep and wake cycles.

These functions of the brain are, literally, what keep us alive.

Slide 25



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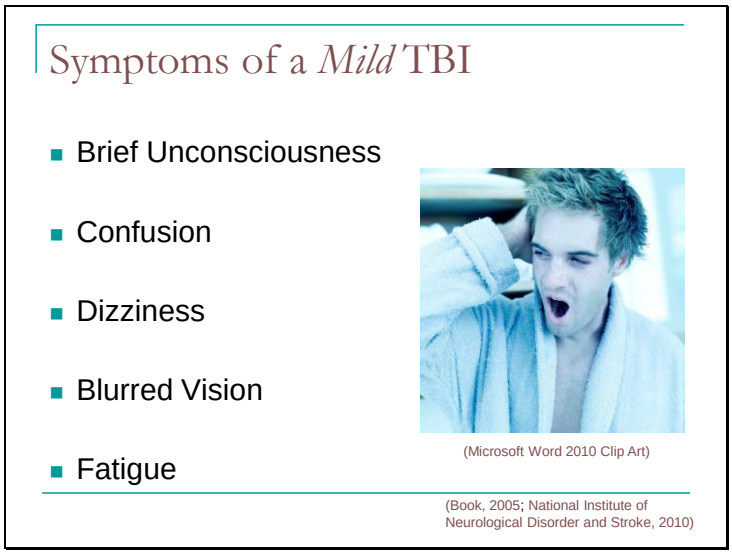
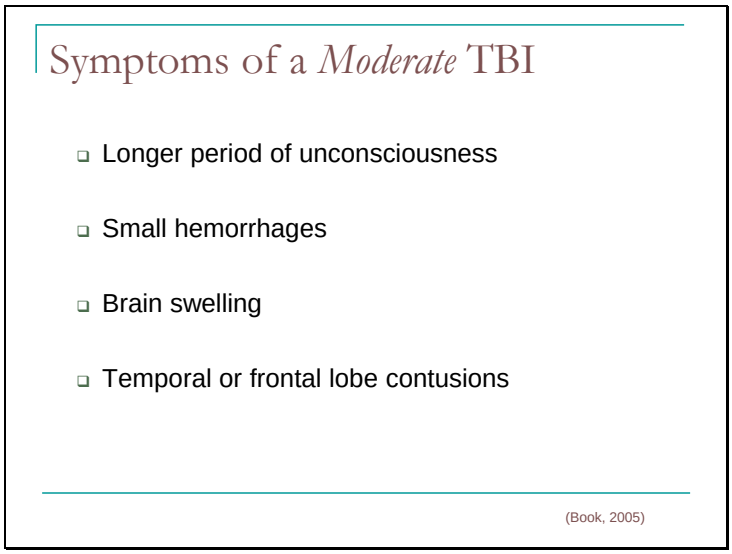


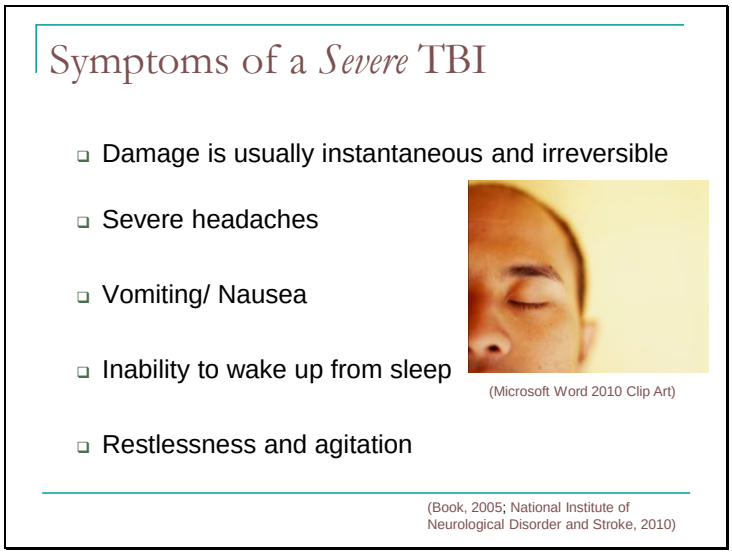
-According to the National Institute of Neurological Disorder and Stroke (2010), individuals sustaining a mild brain injury may experience a brief loss of consciousness, however not necessarily. The individual may feel confused, struggle with headaches, lightheadedness, dizziness, blurred vision, ringing in the ears, fatigue, irregular sleep patterns, poor memory, concentration attention and thinking (National Institute of Neurological Disorder and Stroke, 2010). Book (2005) also wrote that mild traumatic brain injuries (TBIs) most commonly cause a momentary loss of consciousness and possibly a concussion leading to post-concussion syndrome, which includes symptoms such as headaches, irritability, insomnia, and poor concentration and memory.

Slide 27



Moderate brain injuries are usually characterized by a longer period of unconsciousness, small hemorrhages and swelling in the brain tissue (Book, 2005). Most often contusions occur in the temporal or frontal lobes leading to further cognitive and motor deficits (Book, 2005).

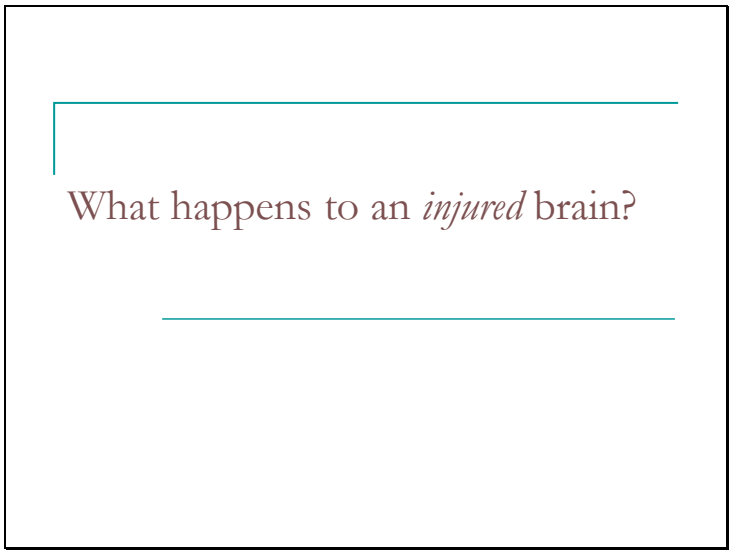
Slide 28



Damage to the brain after a severe injury is usually instantaneous and irreversible due to the forces that cause diffuse axonal injury, disruption of blood vessels, and tissue damage (Book, 2005).

Other symptoms of moderate to severe brain injuries have been provided from the National Institute of Neurological Disorder and Stroke (2010). Often individuals have severe headaches that do not disappear, consistent vomiting or nausea, convulsions, inability to wake up from sleep, dilation of pupils, slurred speech, extremity weakness, coordination deficits, increased confusion, restlessness and agitation (National Institute of Neurological Disorder and Stroke, 2010).

Slide 29



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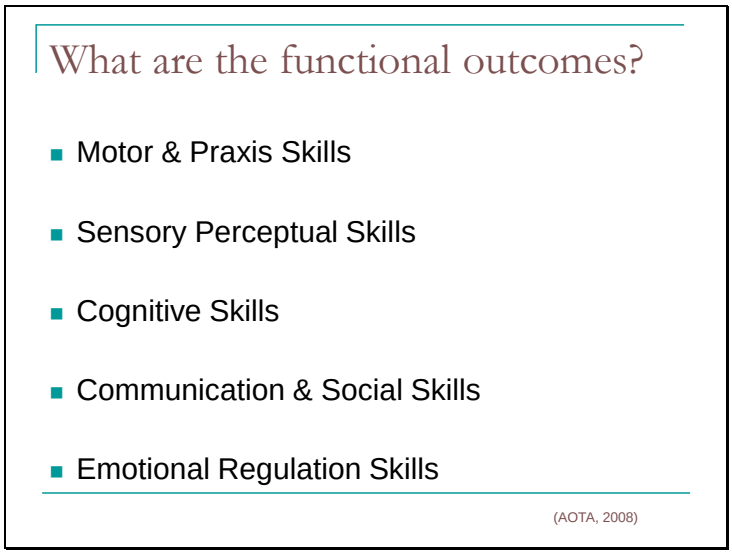
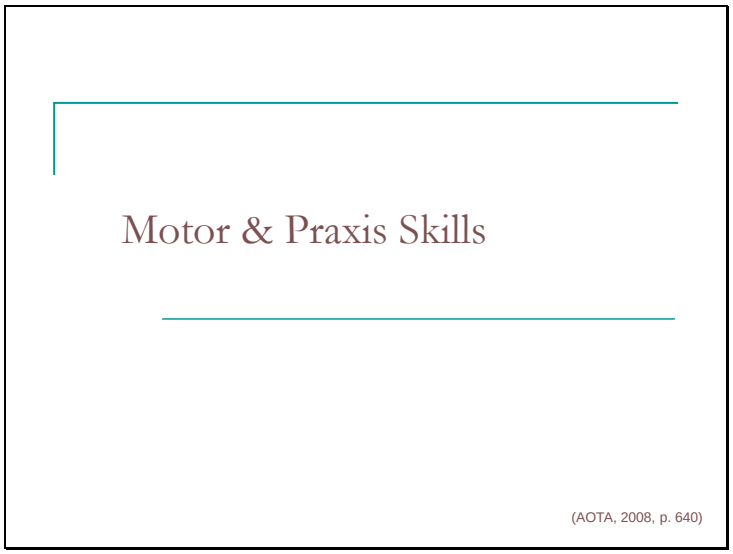


Each of these performance skill sets are affected when someone sustains a brain injury. We will go over them in further detail on subsequent slides.

Slide 31

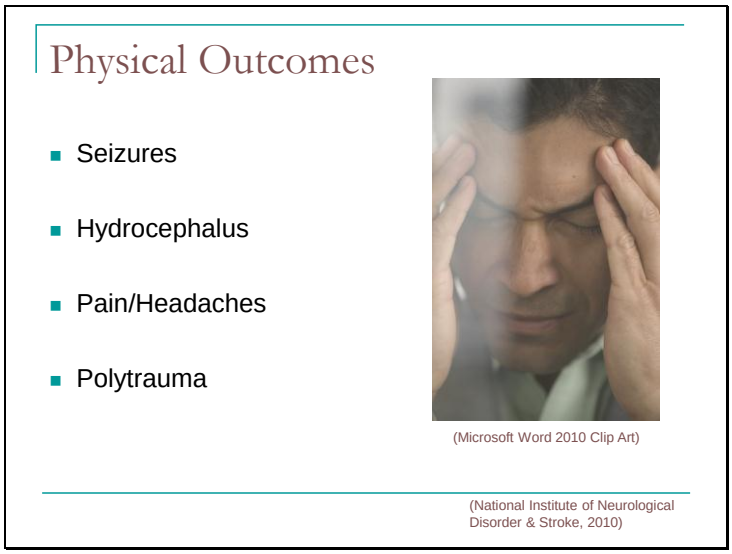


Motor: Actions or behaviors a client uses to move and physically interact with tasks, objects, contexts, and environments. This includes planning, sequencing and executing new and novel movements.

Praxis: Skilled purposeful movements used to carry out sequential motor acts as part of an overall plan rather than individual acts.

(AOTA, 2008, p. 640)

Slide 32



Seizures can occur within the first 24 hours of injury and often increase the risk of further seizures occurring one-week post injury (National Institute of Neurological Disorder and Stroke, 2010).

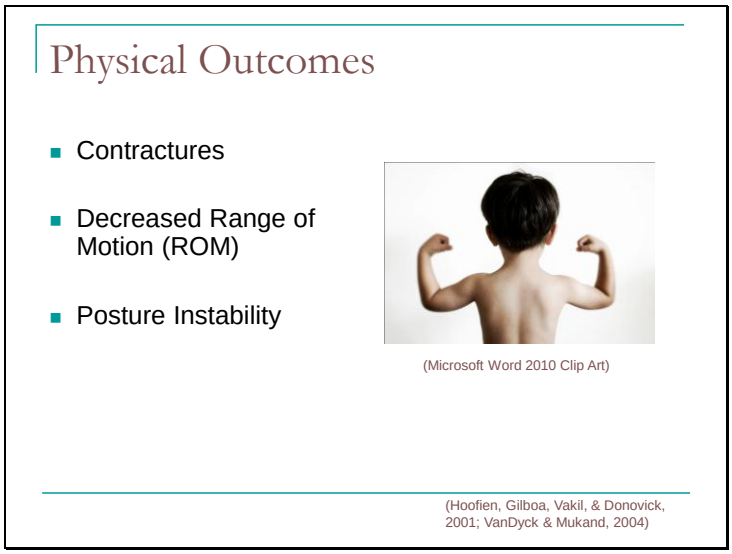
Hydrocephalus may occur when cerebrospinal fluid (CSF) gathers in the brain causing dilation of the cerebral ventricles and a boost in intracranial pressure (ICP) (National Institute of Neurological Disorder and Stroke, 2010). Hydrocephalus does not always occur directly following the injury; it may take up to a year to develop but has been characterized by decreased neurological functioning, behavioral changes, ataxia, and signs of elevated ICP (National Institute of Neurological Disorder and Stroke, 2010).

Pain is often the most common physical deficit brought on by brain injuries. Headaches are the most common form of pain experienced, followed by complications such as bed/pressure sores

of the skin, recurrent bladder infections, pneumonia or other infections, and organ failure (National Institute of Neurological Disorder and Stroke, 2010).

Polytrauma is often the result of multiple complications such as pulmonary dysfunction, cardiovascular dysfunction, gastrointestinal dysfunction, hormonal irregularities, and multiple fractures (National Institute of Neurological Disorder and Stroke, 2010).

Slide 33



Hoofien, Gilboa, Vakil, and Donovick (2001) studied behavior, cognition, social functioning, self-care activities, and general life scenarios with 76 participants who had sustained a TBI, and found that manual speed and dexterity were severely compromised as found through using the Purdue Peg-Board assessment.

VanDyck and Mukand (2004) examined the challenge, prevalence, and complications contractures present when coupled with a TBI. Contractures are found to decrease active and passive range of motion (AROM and PROM) thereby decreasing independence in self-care activities such as grooming, feeding, dressing, etc. These authors associated a TBI with a rapid onset of spasticity due to damage of the upper motor neurons.

Other areas we found were challenging while working with patients included:

Balance & Coordination Deficits

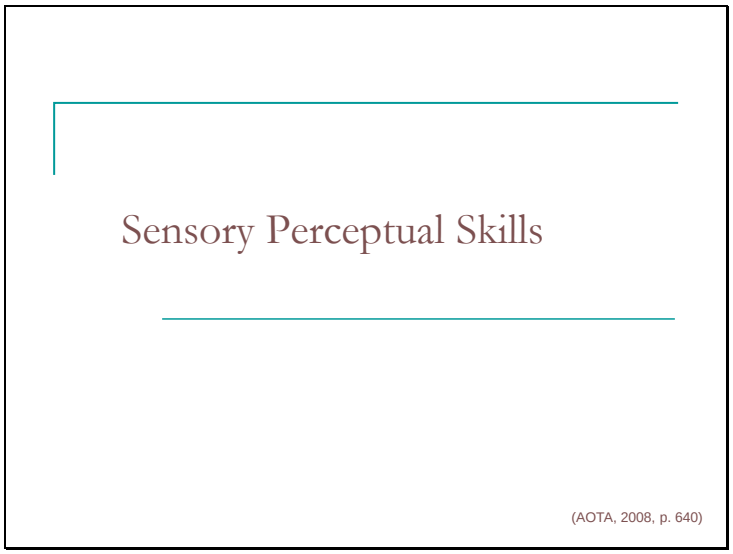
Breathing Abnormalities

Cardiac Irregularity

Sleep/Wake Cycle Disturbances

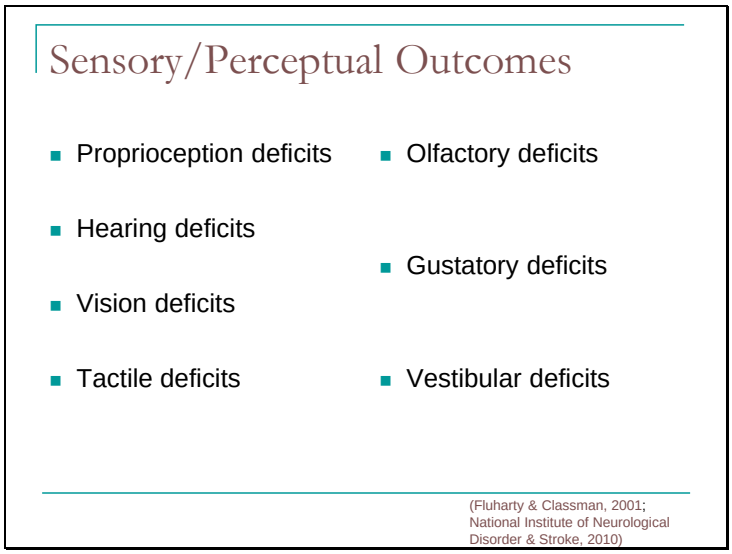
Arousal/ Consciousness

Slide 34



Actions or behaviors a client uses to locate, identify, and respond to sensations and to select, interpret, associate, organize, and remember sensory events based on discriminating experiences through a variety of sensations that include visual, auditory, proprioceptive, tactile, olfactory, gustatory, and vestibular (AOTA, 2008, p. 640).

Slide 35

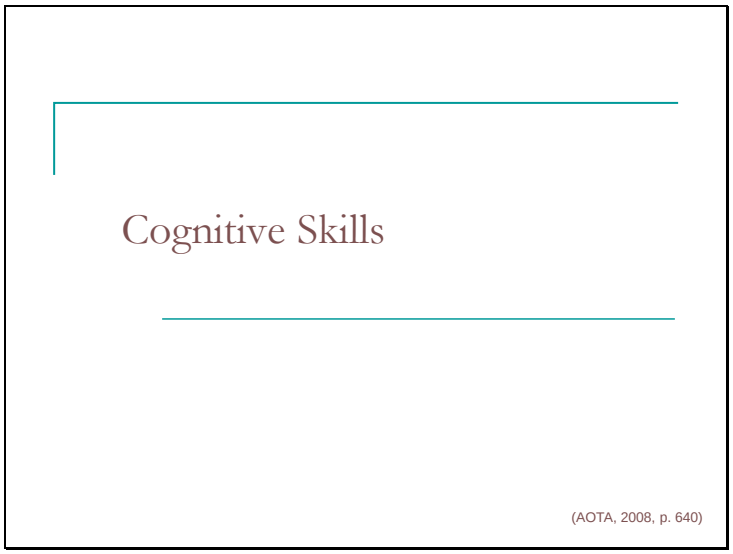


The National Institute of Neurological Disorder and Stroke (2010) reported that often symptoms of mild TBI include blurred vision, ringing in the ears, and bad taste in the mouth.

Fluharty and Classman (2001) found that their 23-year old subject presented with tactile defensiveness, a common sensation deficit experienced by patients with brain injuries.

Much of the evidence we examined was focused highly on communication, cognitive, and social characteristics experienced, though this is an area that may lead to difficulty controlling other behaviors such as verbal outbursts and social inappropriateness.

Slide 36



Actions or behaviors a client uses to plan and manage the performance of an activity (AOTA, 2008, p. 640).

Slide 37

Cognitive Outcomes

- Limitations in following directions
- Disorientation
- Difficulty Multitasking

(Microsoft Word 2010 Clip Art)

- Poor Memory
- Decreased Attention

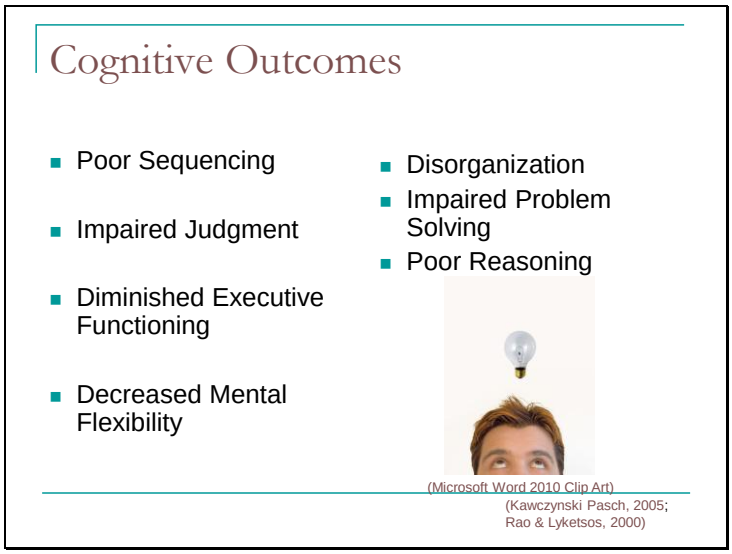
(Fluharty & Classman, 2001; Handel, Ovitt, Spiro, & Rao, 2007; Keung Yuen, 1997)

Fluharty and Classman (2001) provided a case study involving a 23-year old male who sustained a TBI in a MVA. While the man was in a neurobehavioral program, he presented with disorientation, poor listening skills, and limitations in following directions.

Handel, Ovitt, Spiro, and Rao (2007) studied an older individual who was also in an MVA sustaining a severe TBI. Prior to the accident, the patient had a full time job while still playing the role as a husband, and participated in many leisure activities. After the injury, the patient spent 2 weeks in a local hospital followed by a 13-day medically induced coma. Another 10 days were spent in a rehabilitation center. A year following the accident, the patient attempted returning to work, in which he had difficulty with following directions and completing multi-step tasks. Upon evaluation and neuropsychological tests following increased symptoms, the patient was found to have significantly low percentiles in conceptualizing abstract material, word production, and memory (Handel et al., 2007).

Keung Yuen (1997) provided a case report on a 43-year old man who had sustained the injury 20 years prior. The man had sustained frontal lobe damage leading to difficulty initiating conversation, word finding, and slow information processing.

Slide 38



Rao and Lyketsos (2000) saw deficits such as inability to recall events, sequence time, and follow through with new learning. Rao and Lyketsos reported that in a later stage of cognitive disability there are problems with speed of information processing, attention, short and long term memory, problems with executive functioning and mental inflexibility (2000).

As identified previously the frontal lobe is responsible for attention and concentration, self-monitoring, organization, expressive language, motor planning and initiation, self-awareness, personality, mental flexibility, behavior inhibition, emotions, problem solving, planning, and judgment (Kawczynski Pasch, 2005).

Other cognitive areas we have seen impacted with these patients include:

Selecting

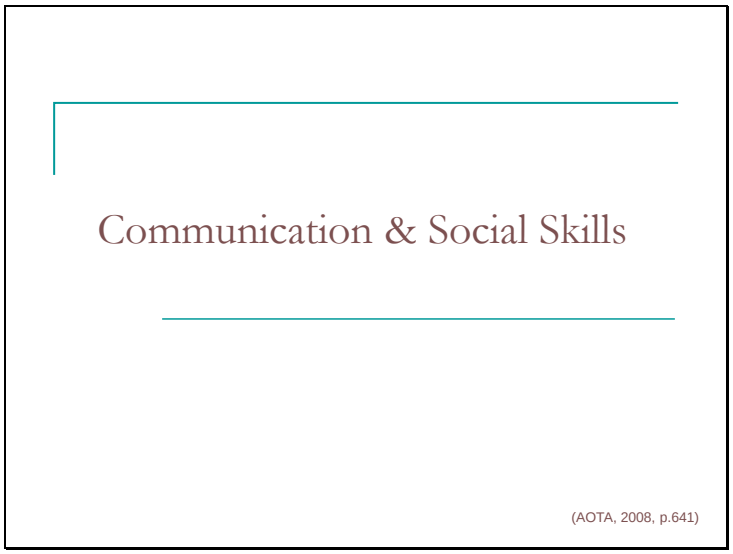
Prioritizing

Creating

Poor decision making

Planning

Slide 39



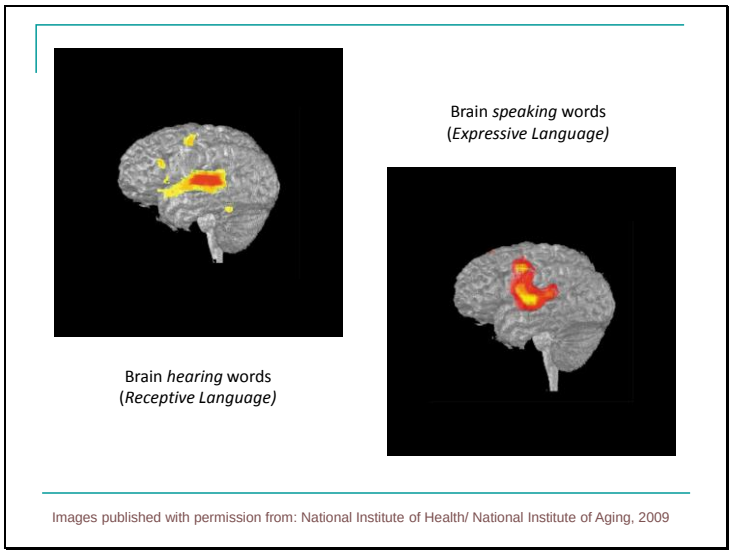
Actions or behaviors a person uses to communicate and interact with others in an interactive environment (AOTA, 2008, p.641)**.**

Slide 40

Fluharty and Classman (2001) found that the 23-year old man they worked with demonstrated passivity and poor listening skills.

Similarly, Keung Yuen (1997) studied the man who had injured his frontal lobe 20 years prior and expressed himself in a negative and sarcastic manner and did not take initiative to begin conversation or socialize with others. His word-finding was limited as well.

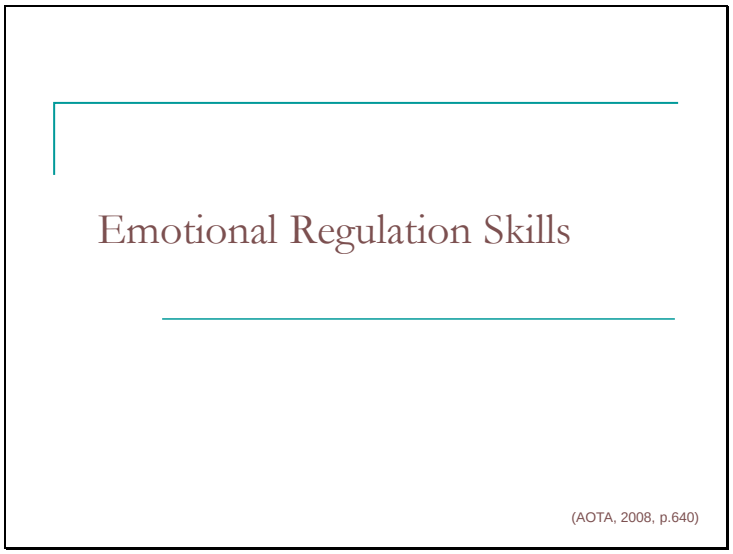
Slide 41



In these images, you can see the areas of the brain that are working when you are receiving or expressing language. When these areas of the brain are damaged in a brain injury, it is obvious that receptive or expressive language will be affected.

Images retrieved from: http://www.nia.nih.gov/Alzheimers/Resources/HighRes.htm

Slide 42

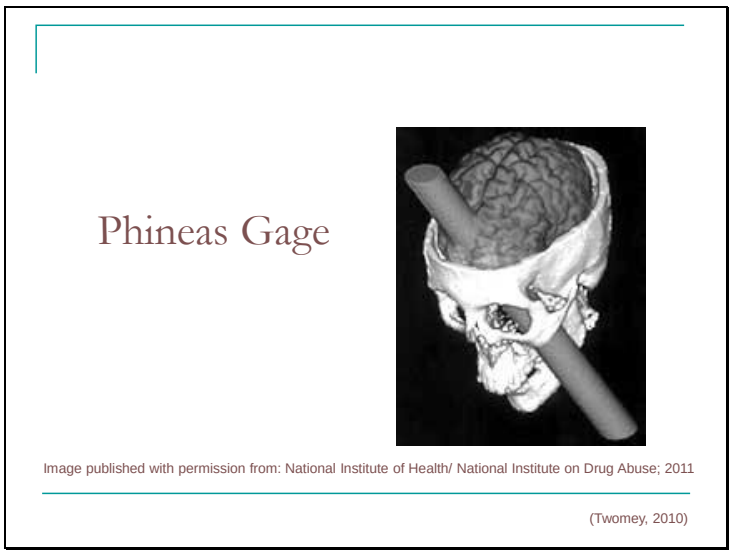


Actions or behaviors a client uses to identify, manage, and express feelings while engaging in activities or interacting with others (AOTA, 2008, p.640)**.**

Perhaps one of the most apparent and devastating effects of sustaining a brain injury falls under the category of emotional/behavioral symptomology.

However, before we discuss the emotional and behavioral symptoms brought on by a brain injury, I want to introduce you to one of the most famous cases of brain injury in regards to emotional symptomology.

Slide 43



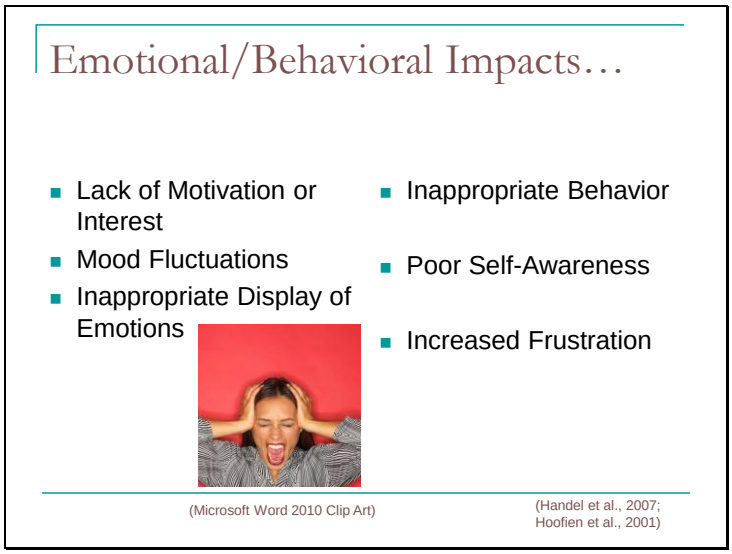
In 1848, Gage, 25-years old, was a railway construction foreman in Vermont working with explosive powder and a tamping iron when a spark caused an explosion that forced the three-foot long rod through his head. The rod penetrated his skull, shot through Gage's brain and exited the skull by his temple; however, Gage survived.

John Martyn Harlow was the physician who treated Gage, and reported that he was not the man his friends knew him as prior to the accident. Before the injury, friends said Gage was quiet and mild mannered. Harlow reported following the injury, Gage's behavior changed dramatically. Gage could no longer stick to plans, acted with obscenity in public, and displayed little respect to his friends. When his job would not employ him following the displays of his hideous behavior, Gage eventually joined family in California where he died due to seizures at the age of 36 (Twomey, 2010).

Image retrieved from:

http://science.education.nih.gov/supplements/nih2/addiction/guide/lesson1-4.htm

Slide 44

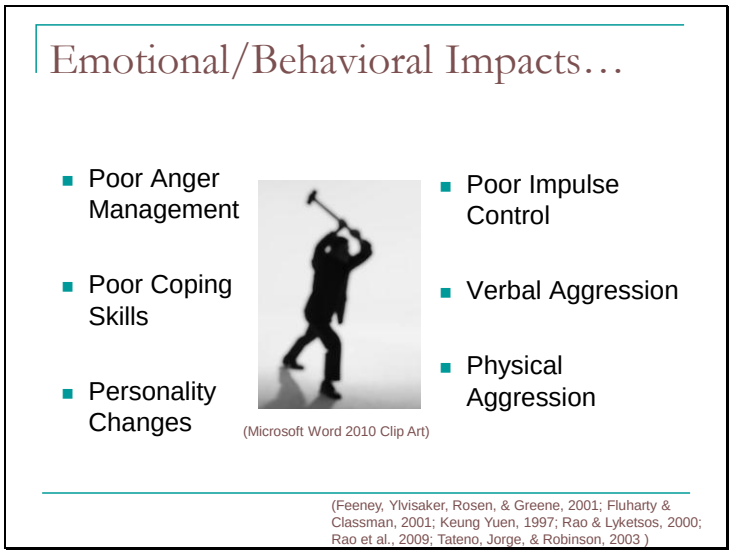


The 58-year old man, studied by Handel et al. (2007), attempted to return to work a year following the MVA that left him with a brain injury. Behavior changes were noticed, and following studies, he was found to have lost interest in most of his previous leisure activities, displayed low motivation, feelings of worthlessness, was unable to make decisions, and demonstrated a depressed mood. At the time, the patient was diagnosed with major depression and recommended to be seen inpatient for treatment; however, the patient and his wife chose to return home. While at home, even more drastic behaviors began to surface as the man became interested in pornography, displayed over-enthusiastic behaviors, and demonstrated social inappropriateness (Handel et al., 2007).

Similarly, Hoofien et al. (2001) conducted a study to measure behavior along with other characteristics in 76 participants who sustained a severe traumatic brain injury. Multiple assessments were used to seek out information from these individuals. Results showed that

participants demonstrated hostility, depression, anxiety, psychotics, paranoia, and poor interpersonal skills. Often, these individuals have extreme difficulty with community reintegration, such as going back to work, due to behavioral and psychosocial issues.

Slide 45



Authors, Feeney, Ylvisaker, Rosen, & Greene, (2001) discussed different behaviors had by patients involved in the Wildwood Behavioral Resource Project (WBRP) in New York. Behaviors included agitation, verbal abuse, wandering, manipulation, aggression, sexual acting out, irritability, disinhibition, and extreme dependence on others.

As stated in the aforementioned literature, Keung Yuen (1997) wrote about a man who had been injured 20 years earlier but who now expressed himself in a negative and sarcastic manner towards others, displaying rude and demeaning behavior.

Rao and Lyketsos (2000) reported that 25% of patients with TBIs experience major depression following injury. Feelings of loss, fatigue, irritability, disinterest, and insomnia are experienced by many individuals six months to two years after the injury. Experiencing mania after TBI is less common than depression, though it is still seen in 9% of patients. Rao and Lyketsos (2000)

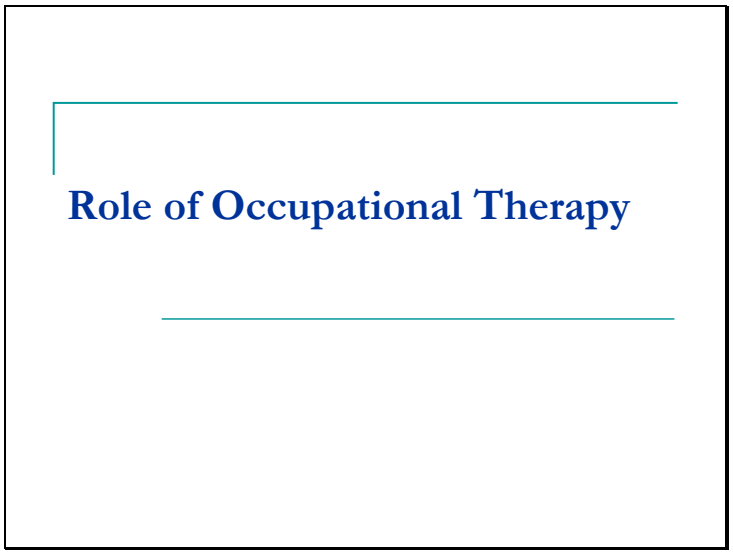
write that mania is more commonly noticed in patients with right hemispheric limbic structure lesions. Mania can include many of the behaviors discussed previously, such as irritability, euphoria, agitation, aggression, or impulsivity.

As reported previously, Fluharty and Classman (2001) examined the case study of the 23-year old man who sustained a severe TBI after an MVA. The patient displayed threatening behaviors along with high agitation towards staff and residents of the facility. In fact, occasionally this patient would strike staff and other patients causing him to be restrained. This type of aggression has been noticed by other authors as well.

Rao et al. (2009) studied 67 patients who sustained a brain injury in at least the last three months. Researchers used the Overt Aggression Scale (OAS) to determine what types of aggression the participants were demonstrating which included: verbal aggression, physical aggression against objects, physical aggression against self and physical aggression against others. The most significant form of aggression experienced by participants was verbal aggression (28.4%). Symptoms of verbal aggression included making loud noises or shouting, yelling mild insults, cursing or making moderate threats, and clear threats of violence towards others or self.

Similarly, Tateno, Jorge, and Robinson (2003) used the OAS to examine aggressive behavior in patients who were all male. Results showed a significant relationship between aggression and patients with TBI. Also, when coupled with major depression, a history of drug or alcohol abuse, or frontal lobe lesions there was a larger correlation between the two.

Slide 46



We, as occupational therapists, assist the patient, his/her family, and friends in living with a sustained traumatic brain injury. Often in acute care settings when the patient is first admitted, the occupational therapist assists with assessing cognitive levels and physical function such as muscle strength and range of motion. A few weeks after injury, the patient may move on to inpatient rehab and with occupational therapy, he/she will focus on regaining skills needed to function as close to independently as possible at home. This may include getting dressed, bathing, cooking, writing bills, grocery shopping, getting in and out of the car, doing laundry, etc. A variety of treatment and assessment strategies will be discussed in subsequent slides. Usually, patients are often recommended to be seen in outpatient therapy once discharged from the hospital, and many of these same areas will be looked at more closely with different strategies, and often in the natural environment of the home.

Slide 47

To begin, in any of the settings (acute, inpatient rehab, or outpatient rehab), we start off with an evaluation which includes the occupational profile and an analysis of occupational performance.

Occupational profile—The initial step in the evaluation process that provides an understanding of the client's occupational history and experiences, patterns of daily living, interests, values, and needs. The client's problems and concerns about performing occupations and daily life activities are identified, and the client's priorities are determined (AOTA, 2008, p.646).

Analysis of occupational performance—The step in the evaluation process during which the client's assets, problems, or potential problems are more specifically identified. Actual performance is often observed in context to identify what supports performance and what hinders performance. Performance skills, performance patterns, context or contexts, activity demands, and client factors are all considered, but only selected aspects may be specifically assessed. Targeted outcomes are identified (AOTA, 2008, p.646).

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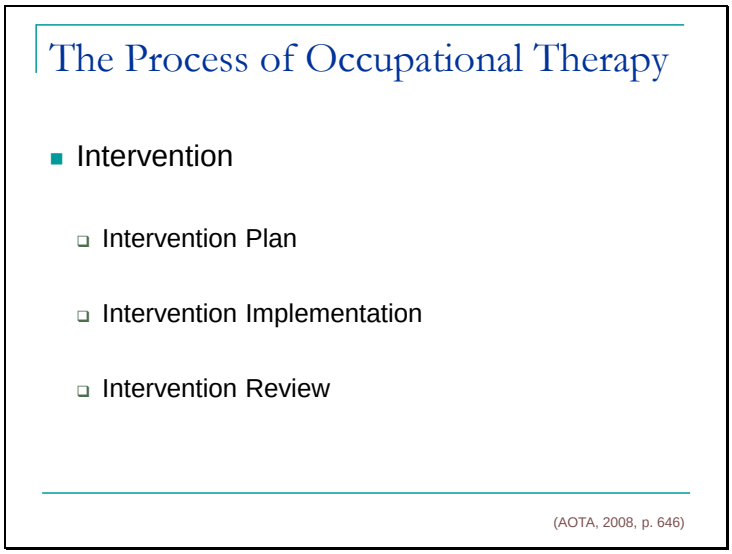

After figuring out what we need to work on while collaborating with the patient, we move on to the intervention phase. This consists of planning, implementing, and reviewing what kinds of treatment strategies have worked and not worked.

Intervention plan—A plan that will guide actions taken and that is developed in collaboration with the client. It is based on selected theories, frames of reference, and evidence. Outcomes to be targeted are confirmed (AOTA, 2008, p.646).

Intervention implementation—Ongoing actions taken to influence and support improved client performance. Interventions are directed at identified outcomes. Client's response is monitored and documented (AOTA, 2008, p.646).

Intervention review—A review of the implementation plan and process as well as its progress toward targeted outcomes (AOTA, 2008, p.646).

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Finally, we move on to the outcome stage. This is where patients like to be. And, this is where we, as therapists, like to get our patients. We hope to get them to a stage of success in reaching their targeted outcomes.

Outcomes—Determination of success in reaching desired targeted outcomes. Outcome assessment information is used to plan future actions with the client and to evaluate the service program (i.e., program evaluation) (AOTA, 2008, p. 646).

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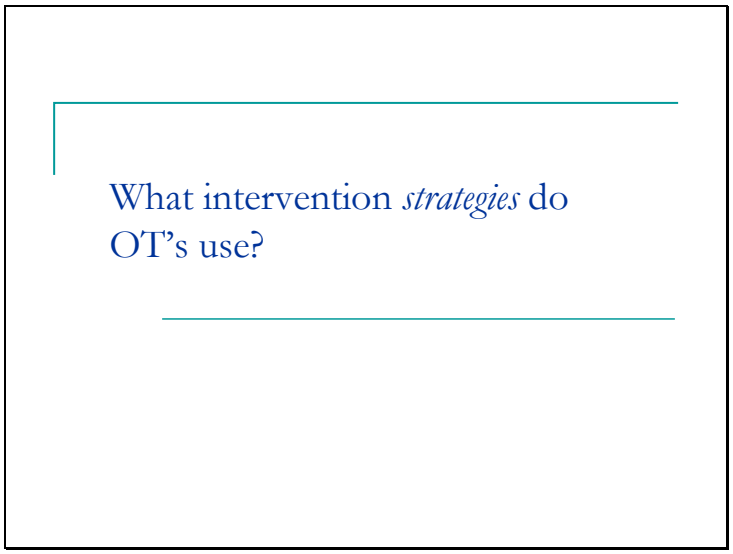

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THERAPEUTIC USE OF SELF—An occupational therapy practitioner's planned use of his or her personality, insights, perceptions, and judgmentsaspart of the therapeutic process (AOTA, 2008, p. 653).

THERAPEUTIC USE OF OCCUPATIONS AND ACTIVITIES – Occupations and activities selected for specific clients that meet therapeutic goals. To use occupations/activities therapeutically, context or contexts, activity demands, and client factors all should be considered in relation to the client's therapeutic goals. Use of assistive technologies, application of universal-design principles, and environmental modifications support the ability of clients to engage in their occupations (AOTA, 2008, p. 653).

-*Occupation Based Activities:*

-The patient will engage in client-directed occupations that match identified goals (AOTA, 2008, p. 653).

-i.e. purchasing groceries and preparing a meal

-*Purposeful Activities*

-The patient will engage in selected activities that allow the him/her to develop skills that enhance occupational engagement (AOTA, 2008, p. 653).

-i.e. practices how to create a grocery list and use appliances

-*Preparatory Activities*

-The therapist selects methods that prepare the patient for occupational performance. These are used in preparation for or concurrently with purposeful or occupation based activities (AOTA, 2008, p. 653).

-i.e. a hand strengthening program is used with theraputty and theraband

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CONSULTATION PROCESS— Practitioners use their knowledge and expertise to collaborate with a patient and their families. This may involve identifying problems, creating solutions, trying solutions, and altering treatment strategies for greater effectiveness. During this phase, the practitioner is not directly responsible for the outcome (AOTA, 2008, p. 654).

EDUCATION PROCESS – The practitioner may impart knowledge and information about occupation, health and participation in occupations but in this process, it may not result in the performance of the occupation (AOTA, 2008, p. 654).

ADVOCACY— The practitioner, in this process, may take power and promote occupational justice while empowering patients and families to find resources to assist them in full participation in daily life occupations (AOTA, 2008, p. 654).

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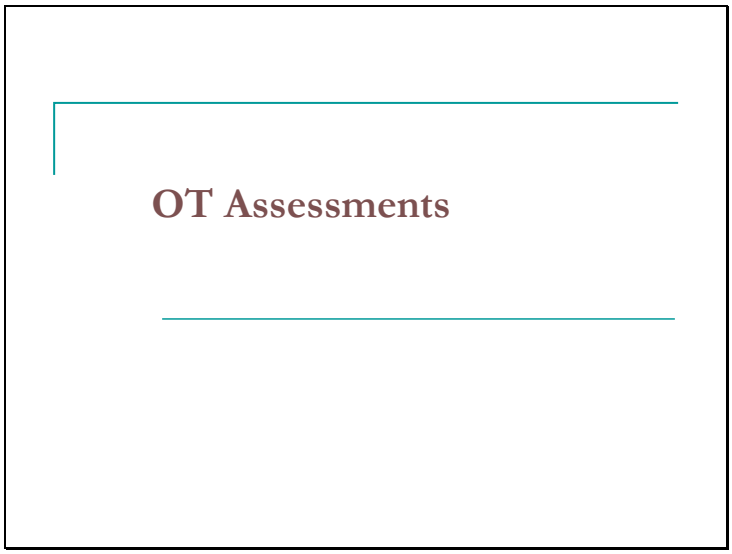

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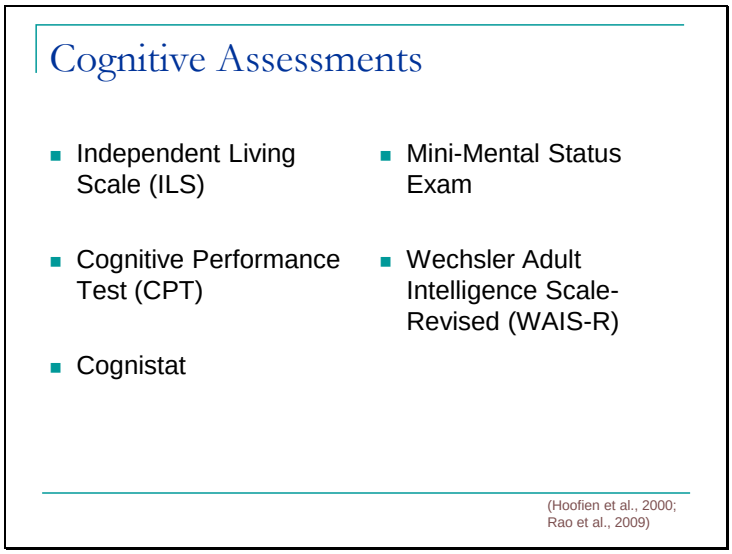

Independent Living Scale: The ILS is designed to assess capabilities in instrumental activities of daily living (IADLs) and to determine the most appropriate living setting for patients. The ILS is composed of five scales: Memory/Orientation, Managing Money, Managing Home and Transportation, Health and Safety, and Social Adjustment (Anderten Loeb, 2007).

Cognitive Performance Test: Functional assessment of activities of daily living (ADLs) and instrumental activities of daily living (IADLs). It relies on observation of 7 tasks: dressing, shopping, preparing food, using a telephone, washing, sorting medications, and traveling (Burns, 2007).

Cognistat: As a screening test, the Cognistat may be given to identify basic strengths and weaknesses so that further assessment can be done if needed, and the data provided by the Cognistat can be used as preliminary data to compare against other tests (Vining Radomski,

2008).

Mini Mental Status Exam: This is a short and simple measure of cognitive performance. It consists of 11 questions in 5 areas of cognition: orientation; memory; attention and calculation; recall; and language (Vining Radomski, 2008).

Wechscler Adult Intelligence Scale: Looks at verbal and performance intelligence (Goodman & Bonder, 2008).

Some examples of cognitive assessments used for patients with a TBI are the Wechsler Adult Intelligence Scale-Revised (WAIS-R), Purdue Peg-Board test, Independent Living Scale (ILS), Cognitive Performance Test (CPT), and Cognistat (Hoofien et al., 2000).

In a study by Hoofien et al. (2000), utilization of cognitive assessments proved useful in determining cognitive functioning of patients ten to twenty years post TBI. Patients with TBI measured at a low-average range through the use of such assessments. Memory was assessed and determined to rank below the 40th percentile. Any form of learning, including verbal learning, in patients ten to twenty years post TBI fell at the 48th percentile ranking. Other cognitive functioning that fell below the normal values based on age demonstrated similar findings.

Patients were found to have greater difficulty performing tasks involving new information, comprehension, arithmetic, similarities between items, arrangement of pictures, assembly of

items from the WAIS-R, digital scanning, digit symbols, picture comprehension, and block design (Hoofien et al., 2000).

The Mini-Mental State Exam (MMSE) and Wisconsin Card Sorting assessments were utilized by Rao and colleagues (2009) to determine cognitive deficits in sixty-seven patients with TBI.

Other assessments we have used include the:

Motor Free Visual Performance Test (MVPT-3)

-The MVPT-3 assesses an individual's visual perceptual ability--with no motor involvement needed to make a response (Colarusso & Hammill, 2007).

Cognitive Assessment of Minnesota (CAM)

-Provides an objective measure of the following areas:

-Attention span

-Memory orientation

-Visual neglect

-Temporal awareness

-Recall/recognition

-Auditory memory and sequencing

-Simple math skills

-Safety and judgment

(Rustad, DeGroot, Jungkunz, Freeberg, Borowick, & Wanttie, 2007)

Kohlman Evaluation of Living Skills (KELS)

-Determines ability to function in 17 basic living skills in the areas of self-care, safety and health, money management, transportation and telephone, and work and leisure (Kohlman Thomson, 2007).

Bay Area Functional Performance Evaluation (BaFPE):

-Task Oriented Assessment (TOA): assess one's ability to act on the environment in goal-directed ways and contains 5 tasks providing information about the patient's cognitive, performance, and affective areas of functoning

-Sorting shells

-Money & marketing

-Home drawing

-Block design

-Kinetic person drawing

-Social Interaction Scale (SIS): assess social behaviors observed in 5 different settings

-One to one interview

-Meal time

-Unstructured group situation

-Structured activity group

-Structured oral group

(Lang Williams & Bloomer, 2007)

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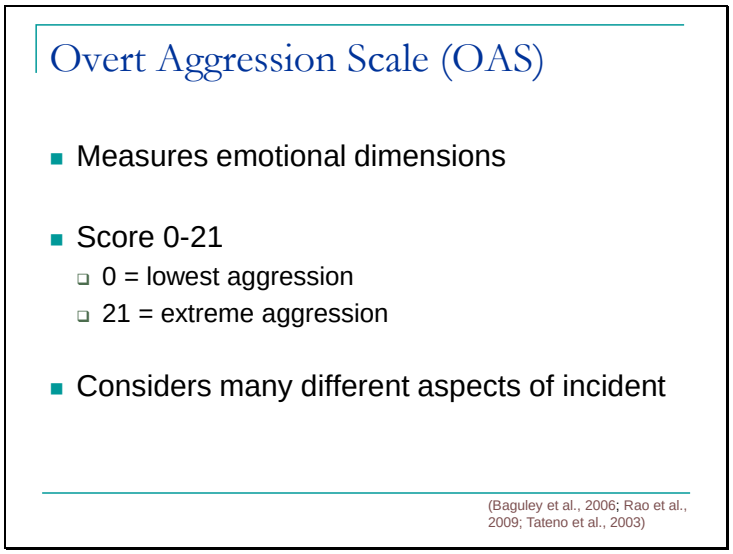
Slide 56



The OAS is designed to explore verbal and physical aggressive behaviors (Rao et al., 2009). Through two specific sections, a researcher is able to indentify the type of aggressive behaviors including "verbal, physical against objects, physical against self, and physical against others," (Rao et al., 2009, p. 422). The scale ranges between zero and twenty-one with the higher scores representing increased aggression.

The second part of the OAS involves interventions provided by staff at the time of the incident. "The Overt Aggression Scale has been validated in adult and pediatric inpatients with neuropsychiatric illness and violent behavior," (Rao et al., 2009, p. 422).

Takes into account temporal context such as the time of incident of aggression as well as the duration of incident.

With a maximum score of twenty-one, the OAS defines any participant as significantly aggressive when a score of three or higher is assigned to a participant on each subtest (Tateno et al., 2003). Data to score the patient on the OAS comes from "the patient, close relatives, nursing staff, and other people who knew the participant well, or from medical records," (Tateno et al., 2003, p. 156).

Used as a primary means to measure aggression's severity and form, the OAS was used by Baguley et al. (2006) to correlate aggression and TBI. Verbal aggression was found to be the most common type of aggression displayed (Baguley et al., 2006). In fact, Baguley and colleagues (2006) found that 25% of the sample was graded as aggressive; a significant amount of the individuals were also at more severe levels of aggression.

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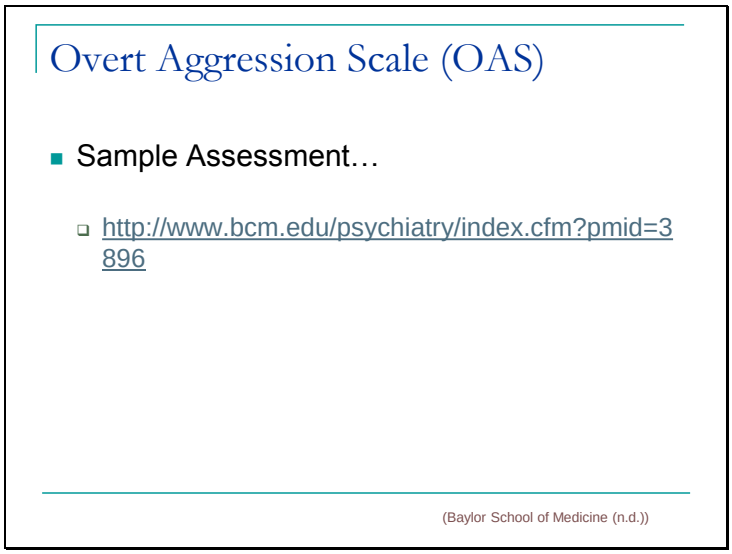

Stuart Yudofsky, M.D., Jonathan Silver, M.D., Wynn Jackson, M.D., and Jean Endicott, Ph.D.

Baylor College, School of Medicine

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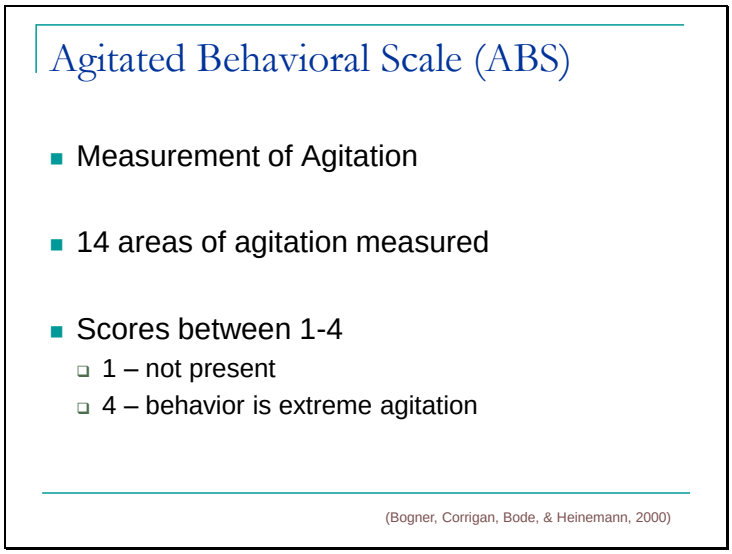

The ABS was originally designed by John Corrigan, a professor in the department of Physical Medicine of Rehabilitation at Ohio State University. Corrigan and colleagues measured the reliability of the ABS with a 208 sample size composed of patients with TBI, dementia, and anoxia (Bogner, Corrigan, Bode & Heinemann, 2000). Corrigan developed the ABS in an effort to measure agitation in the aforementioned populations in order to promote greater success in rehabilitation treatment (Bogner et al., 2000).

The analysis of the ABS through Bogner et al. (2000) found the assessment to be reliable in providing a measure of agitation across the three different diagnostic groups as well as inter-rater reliability throughout the entire staff. Originally consisting of 39 items in the pool questionnaire, the ABS is now shortened to a 14 item selection to "differentiate agitation, frequency of occurrence, and retention of factors present in the original pool" (Bogner et al., 2000, p. 657).

The rankings are from one to four with four being the highest level of degree of which a person demonstrates a specific behavior. Behaviors on the ABS include: attention span, impulsivity, resistance of care, violence, unpredictable anger, self-stimulating behavior, pulling at medical equipment, elopement, restlessness, repetitive behavior, rapid talking patterns, mood irregularity, excesses crying/laughter, and self-abusive behaviors (Bogner et al., 2000).

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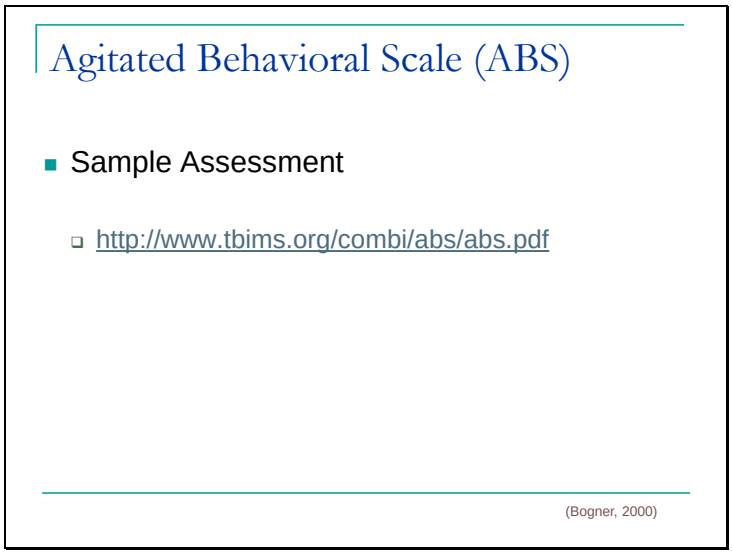

Bogner, J. (2000). The Agitated Behavior Scale. *The Center for Outcome Measurement in Brain Injury*. http://www.tbims.org/combi/abs/abs.pdf (accessed March 15, 2011)

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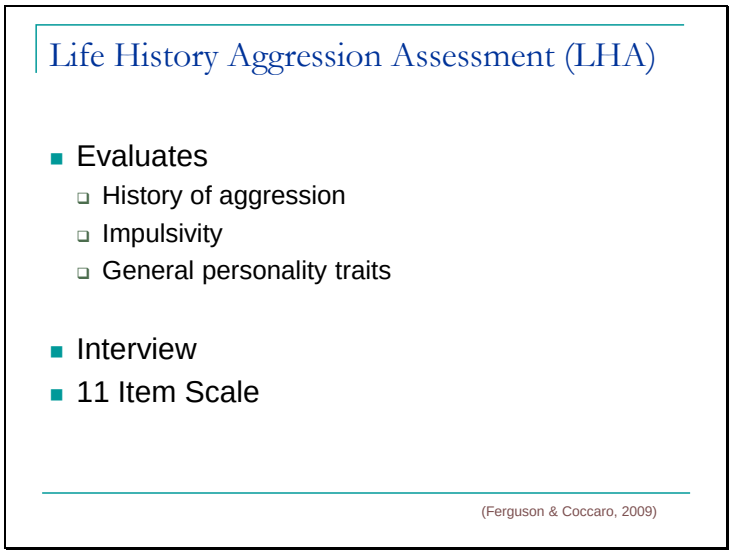

Besides the ABS, the Life History of Aggression Assessment (LHA) evaluates history of aggression, impulsivity, and general personality traits that interfere with participation in daily activities (Ferguson & Coccaro, 2009). Through this measurement, a healthcare provider is able to create a vision of who the patient is and the types of behaviors associated with him/her. Those participants who had a mild to moderate TBI and prior history of aggression, demonstrated greater rates of aggression following the TBI, compared to the sample of non-TBI patients with prior combative tendencies (Ferguson & Coccaro, 2009). The rates of aggression doubled if the participant was also diagnosed prior to the injury with a personality disorder (Ferguson & Coccaro, 2009).

These researchers had a population of 252 participants in this study.

Interview

3 subscales

Aggression express towards others

Antisocial behaviors involving disciplinary action

Injury to self

Moderately strong correlation between having a high score on this test and being an aggressive individual

High validity: good test retest stability, inter rater reliability

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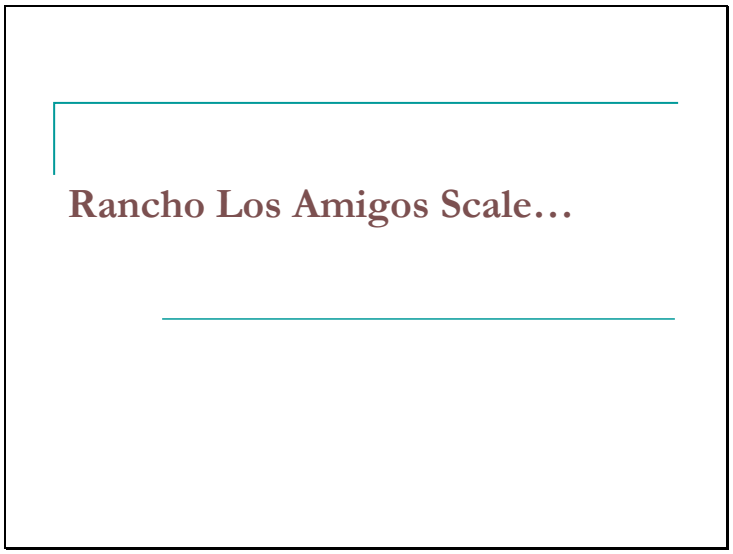

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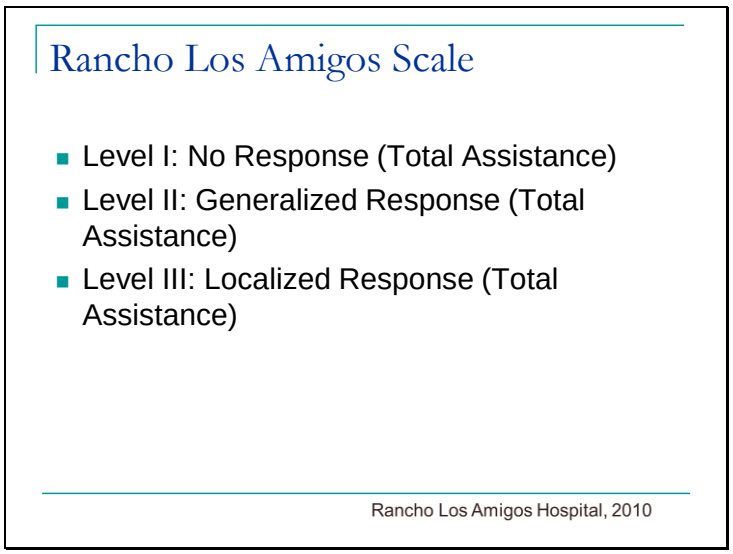

Level I TBI patients demonstrate complete absence of observable change in behavior when presented visual, auditory, tactile, proprioceptive, vestibular or painful stimuli

Level II TBI patients demonstrate generalized reflex response to painful stimuli; Respond to repeated auditory stimuli with increased or decreased activity; Responds to external stimuli with generalized physiological changes, gross body movement, and/or nonpurposeful vocalization; Responses noted above may be the same regardless of type and location of stimuli; Responses may be significantly delayed

Level III TBI patients demonstrate the following: Withdrawal or vocalization to painful stimuli; Turns toward or away from auditory stimuli; Blinks when strong light crosses visual field; Visually follows moving object passed within visual field; Responds to discomfort by pulling tubes or restraints; Responds inconsistently to simple commands; Reponses directly related to type of stimulus; May respond to some people (especially family and friends) but not to others.

(Rancho Los Amigos Hospital, 2010)

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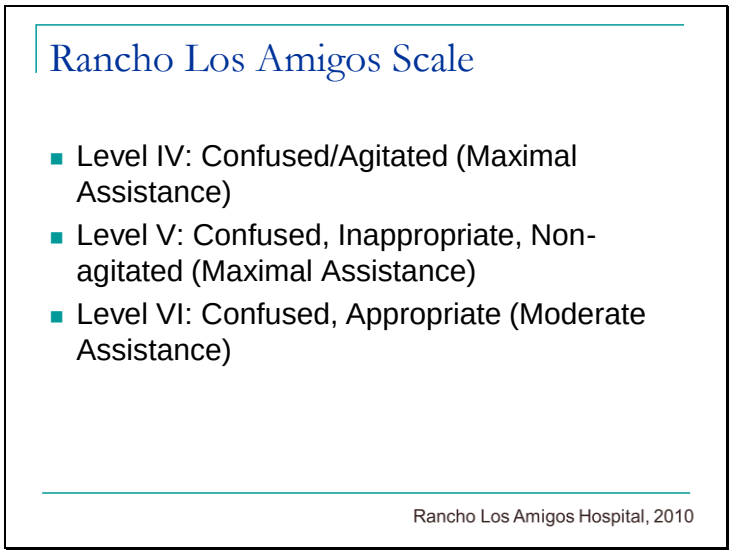


Level IV TBI patients demonstrate the following: Alert & in heightened state of activity; Purposeful attempts to crawl out of bed or remove restraints or tubes; May perform motor activities such as sitting, reaching, and walking, but without any apparent purpose or upon another's request; Very brief and usually nonpurposeful moments of sustained, alternating, and divided attention; Absent short-term memory; May cry or scream out of proportion to stimulus even after its removal; May exhibit aggressive or flight behavior; Mood may swing from euphoric to hostile with no apparent relationship to environmental events; Unable to cooperate with treatment efforts; Verbalizations frequently are incoherent or inappropriate to activity or environment

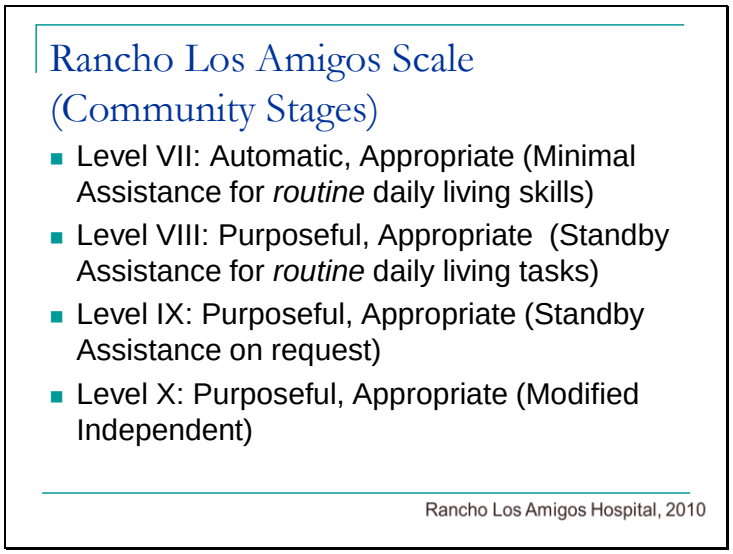
Level V TBI patients will demonstrate the following: Alert, not agitated, but may wander randomly or with a vague intention of going home; may become agitated in response to external stimulation or lack of environmental structure; Not oriented to person, place, or time; Frequent brief periods of nonpurposeful sustained attention; Severely impaired recent memory, with

confusion of past and present in reaction to ongoing activity; Absent goal-directed problem-solving and self-monitoring behavior; Often demonstrates inappropriate use of objects without external direction; May be able to perform previously learned tasks when structure and cues are provided; Unable to learn new information; Able to respond appropriately to simple commands fairly consistently with external structures and cues; Responses to simple commands without external structure are random and nonpurposeful in relation to command; Able to converse on a social, automatic level for brief periods of time when provided external structure and cues; Verbalizations about present events become inappropriate and confabulatory when external structure and cues are not provided.

Level VI TBI patients will demonstrate the following: Inconsistently oriented to person, place, & time; Able to attend to highly familiar tasks in non-distracting environment for 30 minutes with moderate redirection; More depth and detail of remote memory than of recent memory; Vague recognition of some staff; Able to use assistive memory aid with maximum assistance; Emerging awareness of appropriate response to self, family, and basic needs; Moderate assistance needed to resolve barriers (problem solve) to task completion; Supervised for old learning (e.g., self-care); Maximum assistance for new learning with little or no carry-over; Unaware of impairments, disabilities, and safety risks; Consistently follows simple directions; Verbal expressions appropriate in highly familiar and structured situations.

(Rancho Los Amigos Hospital, 2010)

Slide 64



Rancho Level VII TBI patients will demonstrate the following: Consistently oriented to person & place within highly familiar environments; moderate assistance for orientation to time; Able to attend to highly familiar tasks in a non-distracting environment for at least 30 minutes with minimal assistance to complete tasks; Able to use assistive memory devices with minimal assistance; Minimal supervision for new learning; demonstrates carry-over of new learning; Initiates and carries out steps to complete familiar personal and household routines, but has shallow recall of what he or she has been doing; Able to monitor accuracy and completeness of each step in routine personal and household activities of daily living (ADLs) and modify plan with minimal assistance; Superficial awareness of his or her condition but unaware of specific impairments and disabilities and the limits they place on his or her ability to safely, accurately, and completely carry out household, community, work, and leisure tasks; Unrealistic planning; unable to think about consequences of a decision or action; Overestimates abilities; Unaware of

others' needs and feelings; unable to recognize inappropriate social interaction behavior; Oppositional or uncooperative.

Rancho Level VIII TBI patients will demonstrate the following: Consistently oriented to person, place, and time; Independently attends to and completes familiar tasks for 1 hour in a distracting environment; Able to recall and integrate past and recent events; Uses assistive memory devices to recall daily schedule, create to-do lists, and record critical information for later use with standby assistance; Initiates and carries out steps to complete familiar personal, household, community, work, and leisure routines with standby assistance; can modify the plan when needed with minimal assistance; Requires no assistance once new tasks or activities are learned; Aware of and acknowledges impairments and disabilities when they interfere with task completion, but requires standby assistance to take appropriate corrective action; Thinks about consequences of a decision or action with minimal assistance; Overestimates or underestimates abilities; Acknowledges others' needs and feelings and responds appropriately with minimal assistance; Depressed, irritable; low tolerance for frustration; easily angered and argumentative ; Self centered; Uncharacteristically dependent or independent; Able to recognize and acknowledge inappropriate social interaction behavior while it is occurring; takes corrective action with minimal assistance.

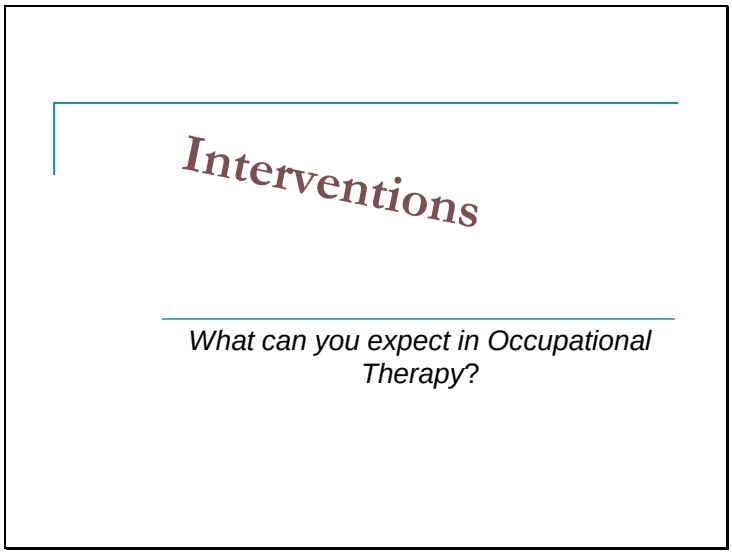
Rancho Level IX TBI patients will demonstrate the following: Independently shifts back and forth between tasks and completes them accurately for at least 2 consecutive hours; Uses assistive memory devices to recall daily schedule, create to-do lists, and record critical information for later use with assistance when requested; When asked, initiates and carries out steps to complete familiar personal, household, work, and leisure tasks independently; completes unfamiliar personal, household, work, and leisure tasks with assistance; Aware of and

acknowledges impairments and disabilities when they interfere with task completion and takes appropriate corrective action; requires standby assistance to anticipate a problem before it occurs and take action to avoid it; When asked, able to think about consequences of decisions or actions with assistance; Accurately estimates abilities but requires standby assistance to adjust to task demands; Acknowledges others' needs and feelings and responds appropriately with standby assistance; May continue to be depressed; May be easily irritable; May have low tolerance for frustration; Able to self-monitor appropriateness of social interaction with standby assistance.

Rancho Level X TBI patients will demonstrate the following: Able to handle multiple tasks simultaneously in all environments but may require periodic breaks; Able to independently procure, create, and maintain own assistive memory devices; Independently initiates and carries out steps to complete familiar and unfamiliar personal, household, community, work, and leisure tasks; may require more than the usual amount of time or compensatory strategies to complete them; Anticipates impact of impairments and disabilities on ability to complete ADLs and takes action to avoid problems before they occur; may require more than the usual amount of time or compensatory strategies; Able to think independently about consequences of decisions or actions but may require more than the usual amount of time or compensatory strategies to select the appropriate decision or action; Accurately estimates abilities and independently adjusts to task demands; Able to recognize the needs and feelings of others and automatically respond in an appropriate manner; May be periodically depressed; Irritability and low tolerance for frustration when sick, fatigued, or under emotional stress; Social interaction behavior is consistently appropriate.

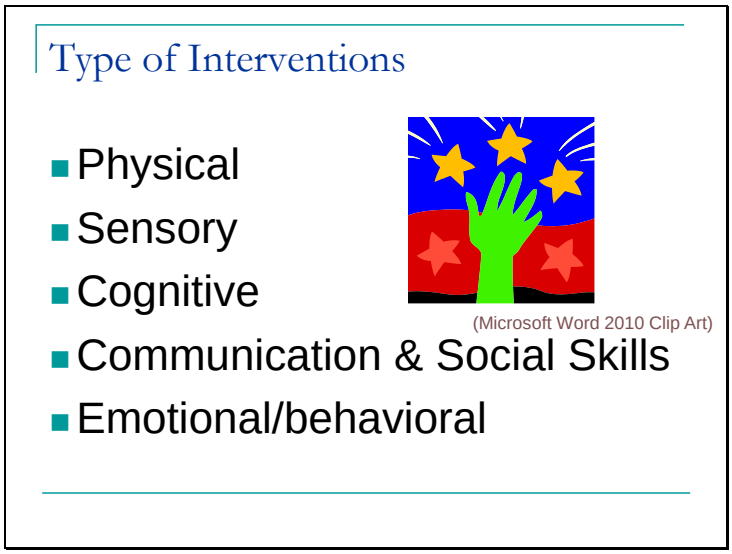
(Rancho Los Amigos Hospital, 2010)

Slide 65



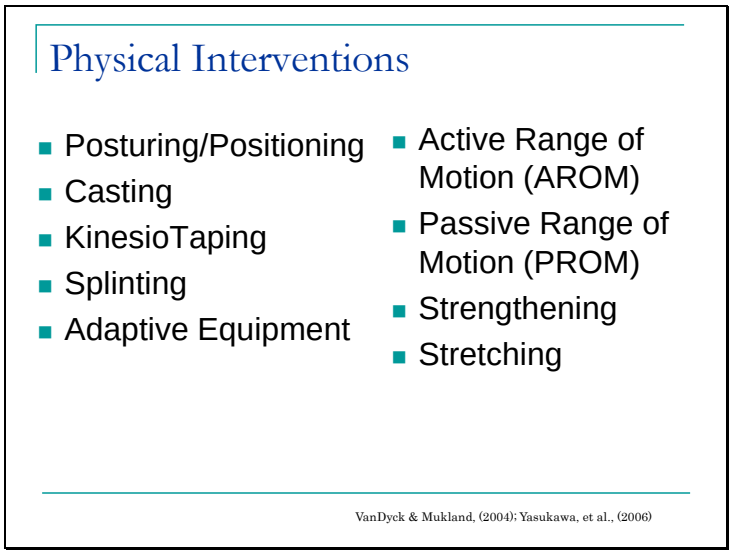
Occupational Therapy has many areas in which interventions take place. The following slides discuss physical, behavioral/emotional, cognitive, sensory, and communication/community re-entry types of interventions occupational therapists provide to a patient following a brain injury.

Slide 66



The following interventions encompass the core of an occupational therapists focus in a therapeutic setting. Although interventions are not limited to these five, most forms of interventions will fall into physical, sensory, cognitive, communication/social skills, and/or emotional/behavioral approaches.

Slide 67



•**First thinking back to how people sustain brain injuries (MVA, accidents, violence, etc.) With these injuries come physical disabilities such as fractures, weakened muscles, contractures, decreased range of motion, limited trunk control, and decreased endurance in daily activities** (VanDyck & Muckand, 2004). **A therapist must treat the physical and the psychosocial needs of the patient**

•**Posturing/Positioning** using a moderate pressure/force applied to the upper trapezius to assist in head control and better bed positioning of head is an example of what therapists may do to prevent neck contractures to patients who are in the lower level of the Rancho scale.

•In a study done by Yasukawa, et al. (2006), KinesioTaping was described as acting as an assistant to the movements and AROM the muscles perform. The researchers who utilized **KinesioTaping** used the materials more for facilitation; for example, low tone or scapular

winging as corrected using a specific taping style to facilitate muscles for correct posture. Kinesiotape can stimulate muscles to strengthen when weak. All in all, KinesioTaping reinforces the physical interventions a therapist may do; it cannot solely correct posture/positioning, or tone, but it can be a great ally in a therapist's corner. (Yasukawa, et al., 2006)

•Physical materials such as splints, casting, or adaptive equipment can promote greater range of motion, prevent contractures, and give the patient more control in their overall participation in daily activities. Because TBI is linked directly to contracture formation (VanDyck & Mukland, 2004), it is imperative that a therapist keep a close eye on the patient's body positioning. With the presence of contractures, participation in daily occupations (self cares, eating, meal preparation, transferring to and from places, etc.) becomes impeded.

Each of these can be graded in order to fit the individual at their particular level of functioning (i.e. make more or less challenging for the person)

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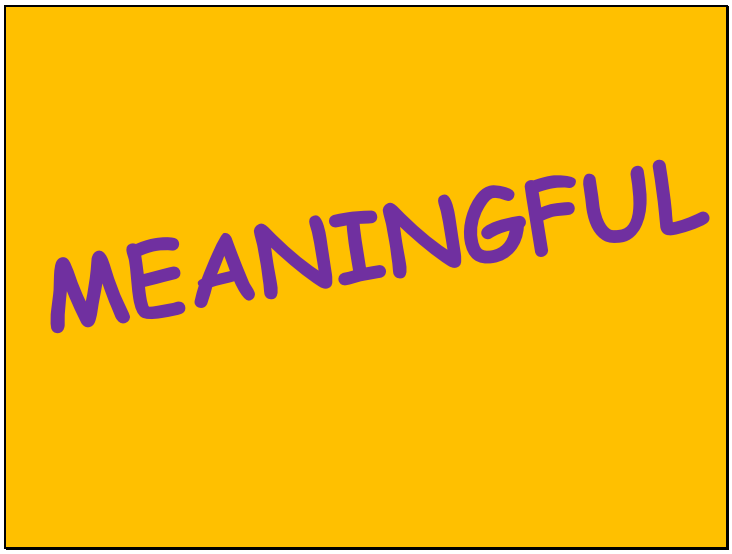
Physical Interventions (cont.)

- Air Splints
- Static standing
- Vision
- Short builds in endurance
- Static sitting
- BoTox for tone
- 1-step motor commands
- Simple/Familiar tasks
  - ADLs

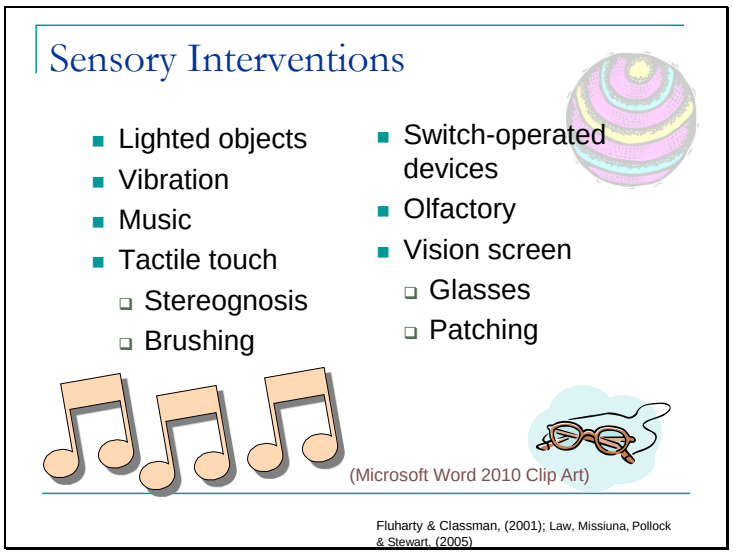
Slide 69



Using the person's daily routines, roles, and habits can guide interventions for caregivers, therapists, or other healthcare workers. Relating tasks that have **personal meaning** to the person can promote greater participation or success on the road to recovery (Cole & Tufano, 2008). So whether you are stretching, working on standing, or motor skills; **make it meaningful** to the person, use familiar items, allow family to engage along with you, play favorite music, cook a favorite snack, etc.

Providing personal meaning and using a client-centered approach for all interventions is who **occupational therapy** is and what they do in their therapeutic approach for a person who has sustained a TBI.

Slide 70



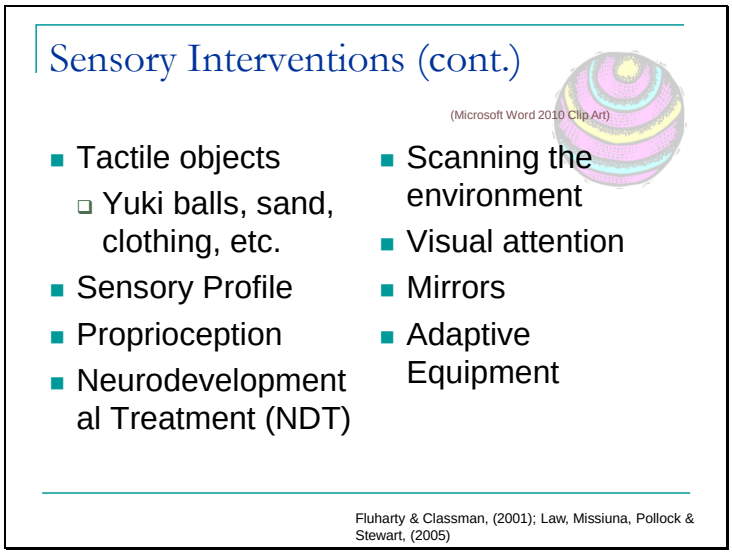
Think of the 5 senses: Taste, Touch, Sight, Smell, and Sound these are the foundations of your interventions.

•Any way to grab the attention of the patient and engage them in the intervention is classified under sensory interventions.

Nearly **90%** of TBI patients experience some form of visual disturbance (Brooke Murtaugh, Vision Program Leader; OTD; Madonna Rehab Hospital) therefore performing a short visual screen is a service occupational therapy provides to detect any changes in the eye since the onset of the brain injury. Patients can experience anything from double vision to decreased eye mobility due to poor muscle strength in the ocular muscles. These vision problems can lead to falls, accidents, and decreased participation in daily occupations (Murtaugh, 2010).

A THOUGHT: A patient could simply be exhibiting aggression because they cannot see the object they want to use (i.e. brush, toothbrush, fork, clothing, etc.)

Slide 71

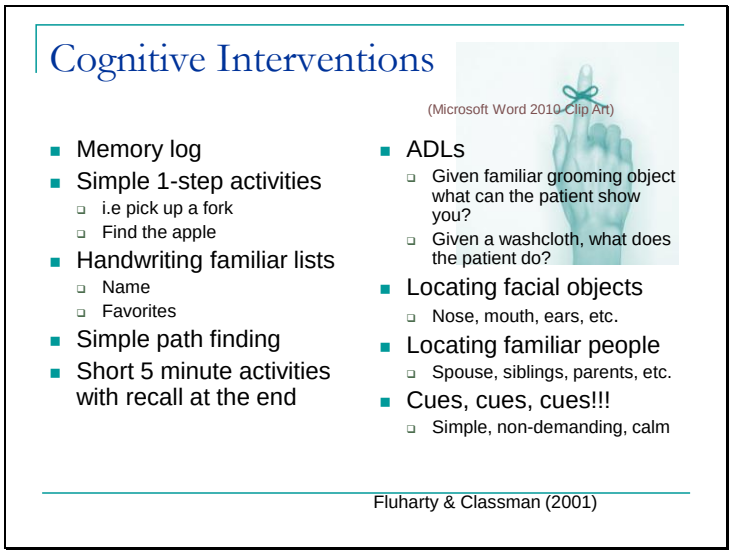


Proprioception refers to one's ability to know where their body parts are in space (Dunn, 2009)

Neurodevelopmental Treatment (NDT) includes using normal body movements to enhance motor learning for patients who have atypical musculo-skeletal movements as a result of a physical disability or injury. Using movement synergies, the therapist facilitates postural control and inhibits unwanted movements or postural reactions. (Law, Missiuna, Pollock & Stewart, 2005)

Adaptive equipment can include switch activated devices (electronic devices, doors, games, etc.), software installed on computers to promote ease in use (adapted keyboard, mouse, monitor, etc..), or voice recognition devices that allow a user to simply command objects using their voice (computer, television, etc.) (Law, Missiuna, Pollock & Stewart, 2005)

Slide 72



•Memory Logs are helpful at any Rancho Level as it allows the patient to see what they have done and try to recall doing the activity. It shows the patient the progress they have made (could do 2 min of standing and now can perform 10, etc.)

•1-step activities are key after a TBI. Too many instructions, distractions or activities detract from your intervention. Keep the environment simple and provide clear, concise activities. Place 2-3 objects to begin with in front of the patient and have them select a familiar object.

•Handwriting for return to school can include simple tasks such as having the patient write their name, age, birthday, school, Mom/Dad's name, pets, favorite food, music, etc. Anything that is familiar to them. This is usually a Racho Level 3-4 and up. Tracing is always an option if handwriting is poor.

•Fluharty & Classman (2001) found that using cognitive tasks such as coin identification, sequencing dressing, and stating date and time were all appropriate interventions in patients with TBI even 10-20 years post-injury.

•Simple pathfinding… find the nurses station, find the pediatric gym, find your room are all good starting pathfinding activities. These can be graded up depending on the success of your patient.

•Short activities are key in working with TBI low level. The activity should be short and simple so not to agitate the patient or cause greater confusion. Engaging in stacking blocks, Dynavision, ball toss, bean bag toss, games all while working on static/dynamic sitting or standing are simple activities that can be ended in a 5-minute block. Have the patient take breaks and allow them to recall by showing or telling you what they were doing. Repetition and familiar tasks are the key (Fluharty & Classman, 2001). Low level TBI patient's are excellent at motor tasks that involve repetition such as stacking blocks, or pushing a switch to operate a frequently used device. It is a fail-proof intervention and meets the goal of that "just right challenge"

•An example of cognitive rehabilitation is Attention Process Training. (Giles, 1989). This process believes that with **adding stress** in any of the following: sustained attention, selective attention, alternating attention, and divided attention, overall **functioning improvements** are made in that particular area.

•In another comparison by Giles (1989), it was found that clients learn by doing. This is a more client-centered approach that uses the client's own motivation, strengths, and skills to make gains in independent. This approach is also echoed by the workings of Gary Kielhofner in the Model of Human Occupation (Cole & Tuffano, 2008) from which this presentation is based on.

•No matter the approach a therapist uses, verbal cues are essential in success of therapeutic goals and keeping the patient calm and feeling in control of the intervention (Hoofien et al., 2000).

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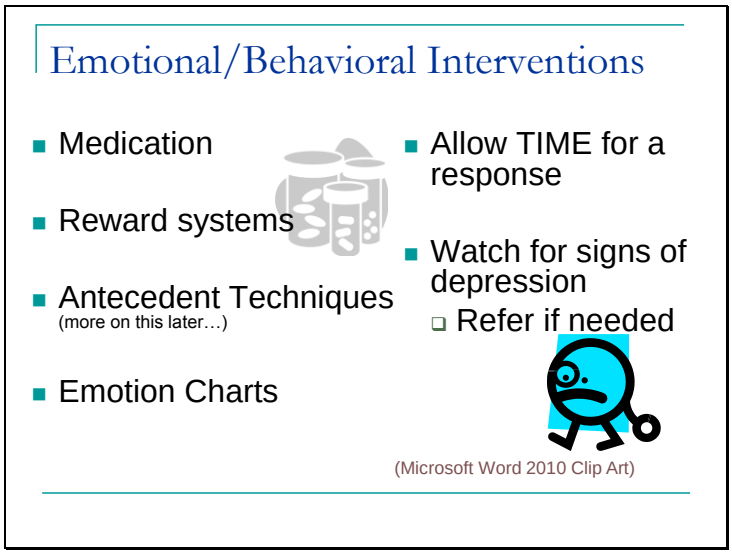
•Recalling that any brain injury is shown to impair an individual's reintegration into social and community activities involving friends, family, school, and life in genera (Slifer & Amari, 2009).

•An example of role playing could be as simple as having the therapist take on the role of a clerk at a local super market and the patient is role-playing a scenario in which he/she is seeking out the produce aisle; simulated environment and interactions.

•In a study by Feeney et al. (2001) researchers found that increasing community reintegration activities using antecedent techniques decreased inappropriate behaviors in the community.

Slide 74



•Aggression is highly linked to TBI (Tateno, 2003) in the forms of physical and verbal assaults against self, others, or property.

•Moreover, when coupled with major depression, a history of drug or alcohol abuse, or frontal lobe lesions there was even a greater correlation between aggression and TBI. (Tateno, 2003)

NOTE: approximately 60% of mild TBI patients show aggressive tendencies which corresponds with other literature. (Rao, 2009)

•Decrease distraction with using neutral color, the object of your intervention should be the only eccentrically colored object in the patient's view of sight.

•Reward systems encourage the low-motivated patients. A reward can stem from favorite music on a radio by pressing a switch, or a sticker for attending to task with excellent behavior

Decreasing visual distractions take a sheet and cover up all the balls, weights, equipment, etc. you are not using but can be distracting to your patient.

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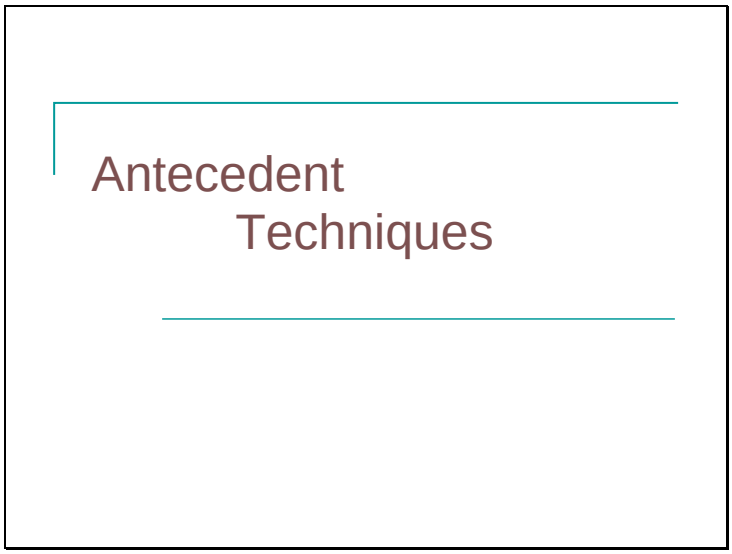
Emotional/Behavioral Interventions (cont.)

- Use of warning system to keep patient abreast of their behavior and the consequences of inappropriate behavior
  - Strike 3 policy
  - 5 second grace

(Microsoft Word 2010 Clip Art)

- Know the signs of agitation
  - Verbal
  - Physical
  - Increased heart rate (if non-responsive

Slide 76

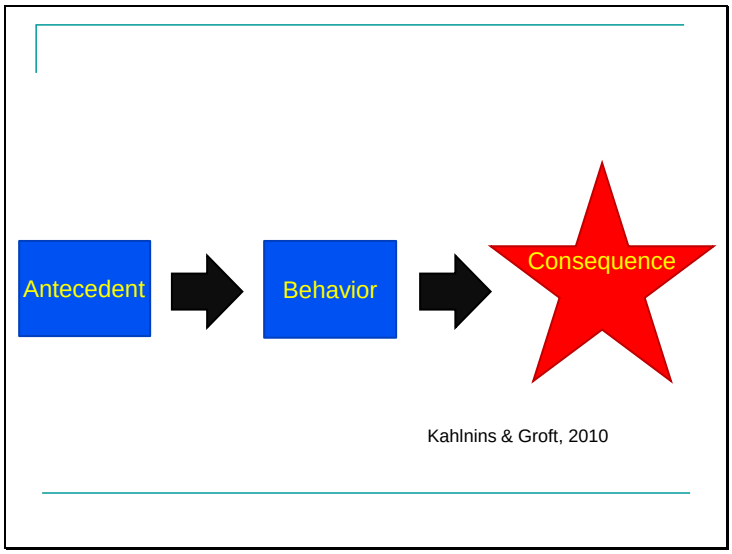


•The next part of this presentation describes what antecedent techniques are, how they are used, who can use them, and what impact they have on the TBI population.

Slide 77

•Play the You Tube clip of the Jackson 5 singing “A-B-C.”

Slide 78



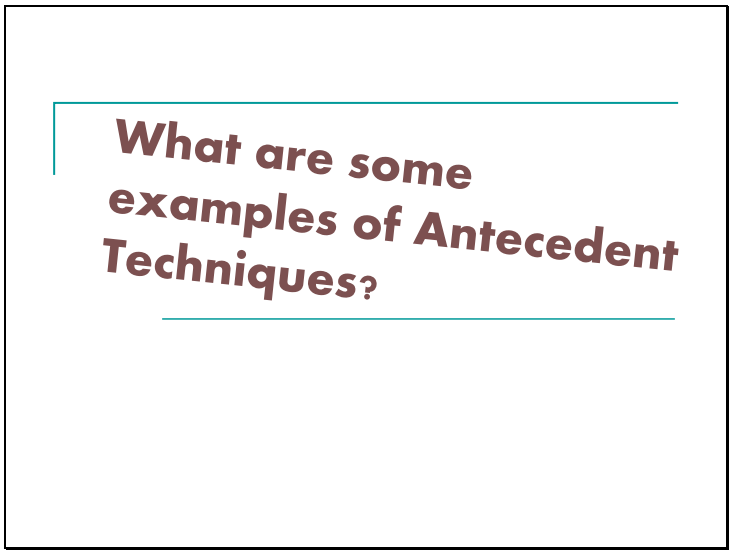
Antecedent is what is done prior to a behavior manifesting

Behavior is the action (yelling, hitting, throwing something, etc.)

Consequence is the punishment, reward, or reaction to the behavior

(Kahlnins & Groft, 2010)

Slide 79



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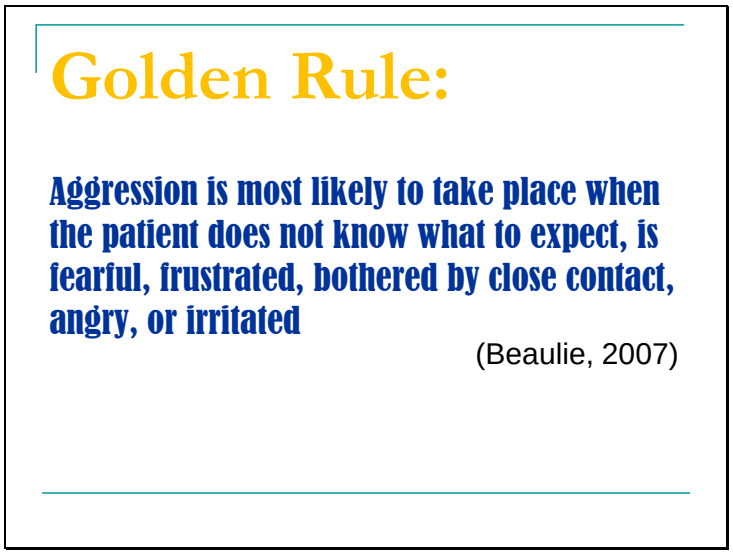
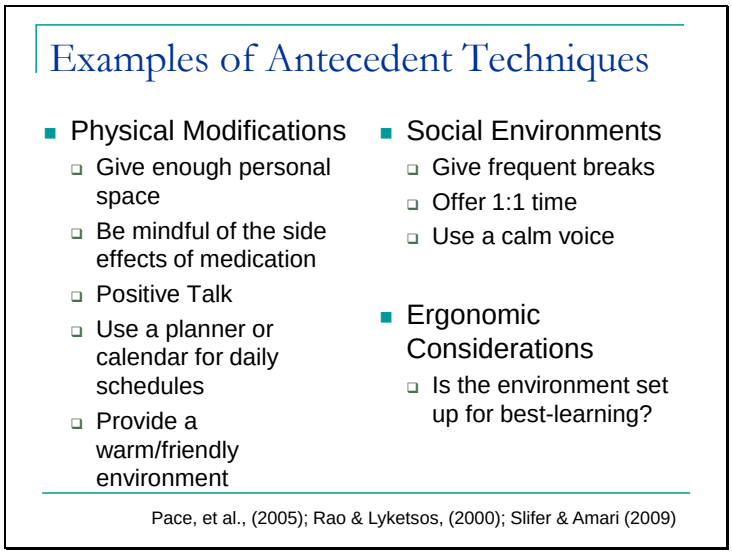


The key to working with an individual who has had a brain injury is this rule.

Slide 81



Physical Modifications:

•Remember those people who invade your "personal bubble?" Remember how annoying that is and how uncomfortable you are?

Now, imagine if you have a brain injury and you are trying to remember how to take a shower and you have a therapist or family member breathing down your neck watching your every move…

Put yourself in their shoes. They may already be confused about how exactly to get dressed or brush their teeth again, but on top of it you are standing their in their "personal bubble."

•So, what is the right amount of personal space? A good rule of thumb is to take a step back from what you feel is comfortable. As long as the individual is safe of course. Remember from previous slides we learned that perception is altered in the injured brain so what you may feel is appropriate personal space may not be to the individual.

(Pace, et al., 2005)

•Side effects of medication can cause fatigue, dizziness, and other symptoms that effect clear thinking. Be aware of the side effects of the medications your loved one or patient is on and when the dose is given. If it is right before therapy and you constantly find your patient "non-compliant" maybe it's not your patient… maybe it's their medication. Can that medication be taken at a different time or can you change your therapy to a different time? Same goes for activities at home.

•Common medications used to control aggressive behaviors, agitation, irritability and other symptoms of TBI include: dopaminergics, psychostimulants, serotonin-specific reuptake inhibitors (SSRIs), opiod antagonists, psychostimulants, dextroamphetamine, amantadine, bromocriptine, high-dose betablockers, buspirone, trazodone, and anticonvulsants.

(Rao & Lyketsos, 2000)

Social Environments

•As learned from previous slides, persons with a brain injury fatigue easier. Therefore when doing any task, provide extra breaks for the person to rest and re-charge their brain. Giving more frequent breaks can increase independence and *completion* of daily tasks. (Pace, et al., 2005)

•Can you give the person 1:1 time- at home or in therapy? Time alone where your focus is on the individual helps the individual to feel valued, respected, and overall the patient is motivated to do well (Slifer & Amari, 2009).

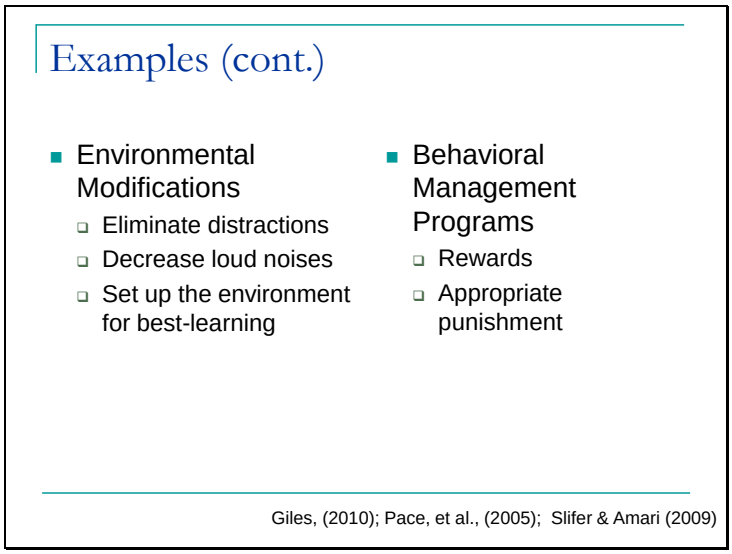
Ergonomic Considerations

•What can you do to the environment the individual interacts with on a constant basis that promotes best learning?

•Can you adjust seating on the chair they use to do computer work?

•Can you move their personal items to a level that is in eye site and does not cause them to constantly be in a stooping, bending, crouching, or reaching position?

Slide 82



Environmental Modifications:

Eliminating distractions can include taking the individual to a quiet, less busy location. For example, in therapy, move the patient from the busy gym to a small private room if they are available at your facility.

Decreasing loud noises can be as simple as turning off fans, loud electronic devices not being used (television, radio, computer, etc.) and again, taking the individual to a quiet location.

Get rid of the harsh lighting when possible (i.e. florescent lighting) and opt for a location that has more natural light.

Best learning refers to the environmental set up including location of items the individual will be using in the session or throughout their day at home. This means set up all necessary materials within reach and in sight of the individual. For example, in the morning when the invidual is performing their daily self-care routine set up the environment so that the toothbrush, toothpaste, brush, etc. are all in a designated area that the patient is familiar with. This builds a routine in the

daily self care regimen. The familiarity of placing items in the same bin and retrieving them every morning decreases the possibility of the items getting lost and the individual getting agitated. Routine overall promotes greater independence in activities of daily living (ADLS)

Slifer and Amari (2009)

Behavioral Management

Pace et al. (2005) found that using longer warning times prior to installation of a reinforcement and language modifications (more age-appropriate to participants) were used as antecedent approaches in order to decrease inappropriate behavior.

•Reward the behavior you want (Slifer & Amari, 2009)

•Reward the patient on what is meaningful and motivating to them (Slifer & Amari, 2009)

•Disregard or Dismiss the behavior/reaction that is undesired (Slifer & Amari, 2009)

•Working with a patient's own motivation, strengths, and skills to make gains in independence has been shown to be effective (Giles, 2010).

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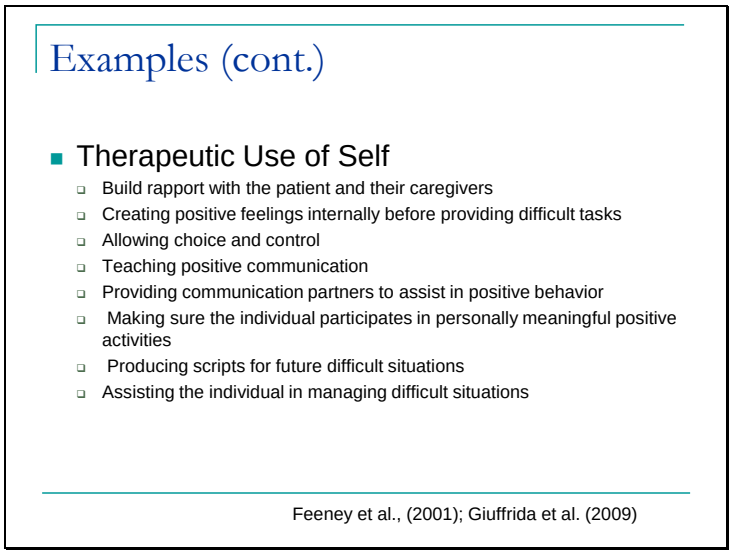
Due to the nature and impact of a TBI, "ability to learn and retain basic personal care skills, instrumental life skills, and work skills" are all impaired

(Giuffrida et al., 2009, p. 398)

This is the essence of why antecedent techniques should be applied.

Slide 84

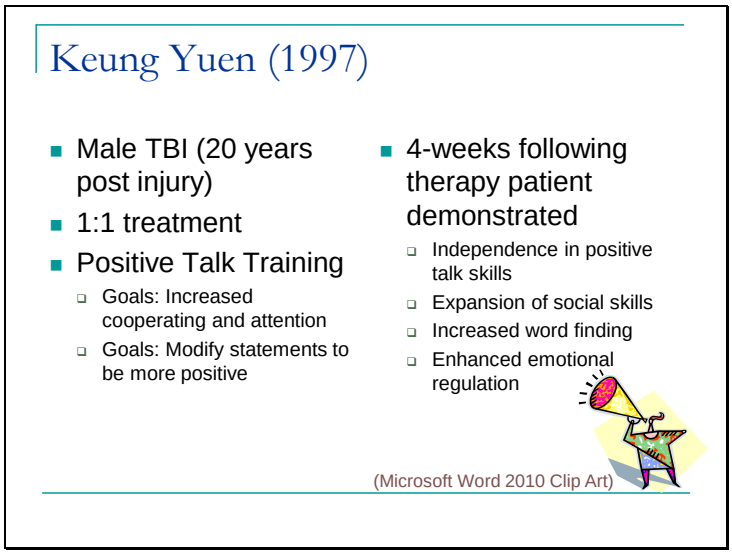


•Therapeutic Use of Self is sited and defined by the American Journal of Occupational Therapy Practice Framework Domain and Process 2nd Edition (2008) as "An occupational therapy practioner's planned use of his or her personality, insights, perceptions, and judgments as part of the therapeutic profess (adapted from Punwar & Peloquin, 2000, p.285)

•Giuffrida et al. (2009) provided strong evidence to support the idea that therapy focusing on functional and meaningful activities proves to be more successful than that of rote exercise.

Slide 85

Slide 86



•Yuen (1997) used an antecedent technique referred to as positive talk training on a 43 year old male who sustained a TBI 23 years prior to this particular treatment. Prior to this treatment, the male was continuing to demonstrate verbal and physical aggression towards others.

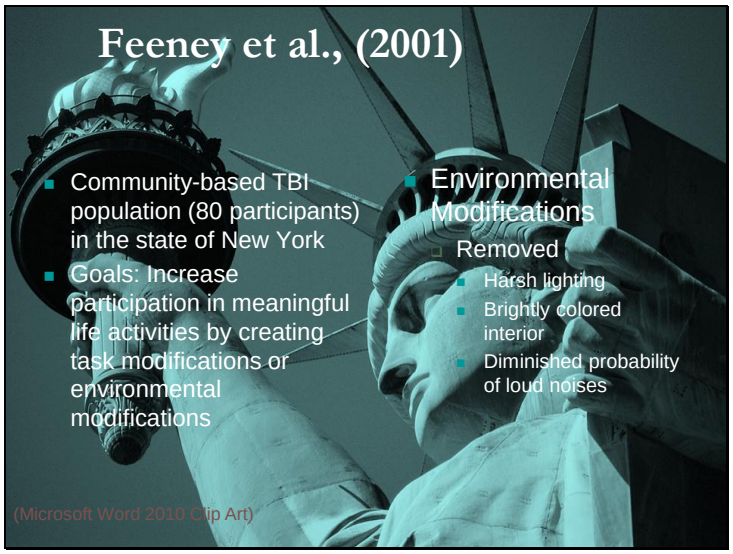
•The focus of treatment was 1:1 occupational therapy for four weeks. The training included modifying statements the male made to be more positive. For example:

❖ "I can't do it" was turned into "I will try my best."

•Following four weeks of positive talk training through occupational therapy, the male was able to perform positive talk training without the use of multiple verbal prompts. Moreover, the positive talk training promoted greater word finding, expansion of social skills, increased independence in emotional regulation, and a heightened quality of life.

Keung Yuen (1997)

Slide 87



•This program was ran through a grant as an experimental project in the state of New York.

•The main antecedent approach was using environmental modifications within the environment during participation in meaningful activities.

•Overall Feeney et al. (2001) found that antecedent-focused treatments increased community reintegration and the following behaviors: agitation, verbal abuse, wandering, manipulations, aggression, sexual acting out, irritability, disinhibiting behavior, and extreme dependence.

Feeney et al., (2001)

Slide 88

•Using antecedent techniques such as environmental modifications was projected to save the state of New York nearly $125,000 annually should the program be repeated.

•Overall implementing this program was found to be cost-effective for the state of New York

Feeney et al., (2001)

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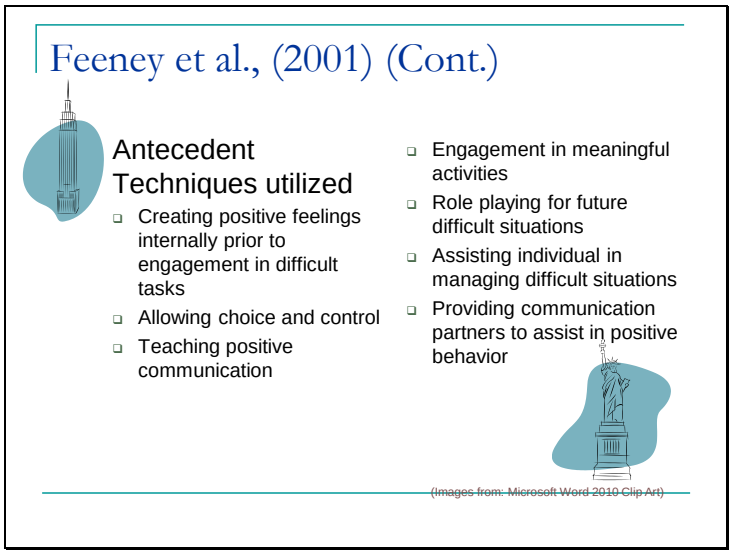

•Services ranged from 2 hours to many hours of direct support depending on the client needs.

Personnel providing services were unpaid positions.

Feeney et al., (2001)

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Feeney et al., (2001) (Cont.)

- Outcomes measured 3-4 years later
  - Went on to live successfully in the community
    - 82% (1996)
    - 87% (1997)

(Microsoft Word 2010 Clip Art)

•After 3 years 82% of the participants were living successfully in the community

•After 4 years 87% of the participants were living successfully in the community

(Feeney et al., 2001)

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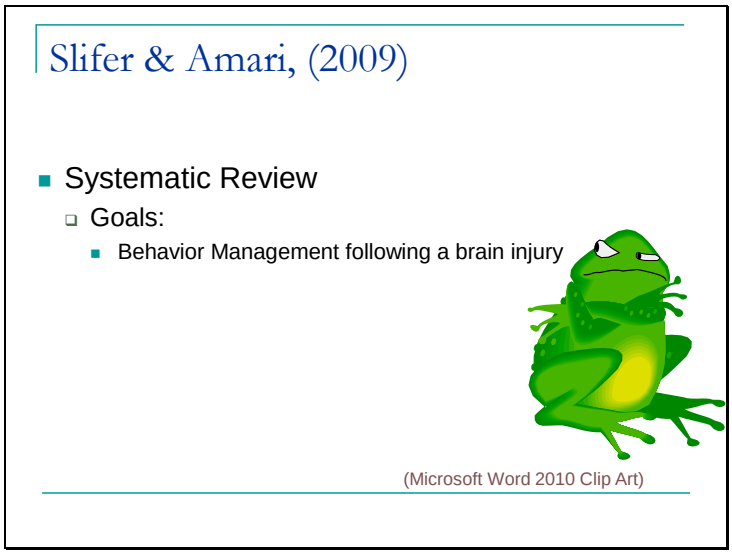

•This systematic study reviewed the effectiveness of behavioral treatment using antecedent techniques, operant contingency management, and combination therapy (using both of the aforementioned therapeutic approaches) following a brain injury. Overall most studies consisting of behavioral management has been single-subject studies. (Slifer & Amari, 2009)

•The behavioral guidelines set by Slifer & Amari (2009) include: direct behavioral observations, assessing the environment, applying appropriate antecedent techniques, and teaching strategies for positive behavior and coping mechanisms.

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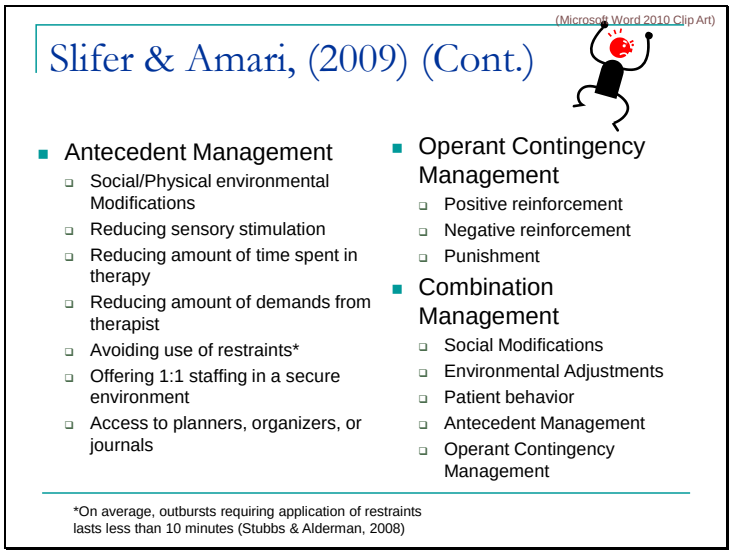
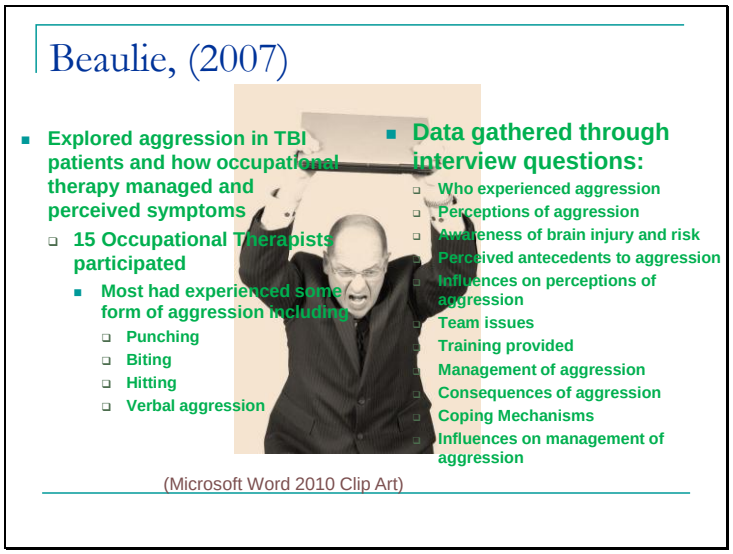


•Combination Management (using both treatment approaches) was found to be most effective in this case! (Slifer & Amari, 2009)

*Stubbs & Alderman (2008) Found that most outbursts and aggressive incidents lasted less than 10 minutes. Therefore by the time a person is placed in restraints for safety, the outburst is most likely to be declining or completed; making restraints not applicable for their current state.

Slide 93



•Beaulie, who has over 20 years of experience in the field of occupational therapy, was able to explore how aggression in patients with a brain injury is perceived, as well as managed by occupational therapists. She used a qualitative research design to conduct the study using open-ended questions allowing participants to answer freely.

•15 occupational therapists were chosen and recruited through their managers. These healthcare workers interacted and worked with adults injured from a brain trauma who also showed symptoms of aggression. The mean age of the participants was 33 years old; 13 were female, 2 being male. The majority of the therapists (11) worked in a brain injury specialty while the rest (4) worked in neurological rehab.

•Some of the aggressive behaviors experienced included: punching, biting, hitting, throwing objects, invading personal space of others around, shaking fists, or glaring.

•Semi-structured interviews, which lasted about 45 minutes, were completed with each participant. Questions included topics such as therapists' perception of the aggression, influences their perceptions, and management of the aggressive behavior.

•Categories included the following:

•experienced aggression

•perceptions of aggression

•awareness of brain injury and risk

•perceived antecedents to aggression

•influences on perceptions of aggression

•team issues

•training provided,

•management of aggression

•consequences of aggression

• coping mechanisms

• influences on therapists' management of aggression.

(Beaulie, 2007)

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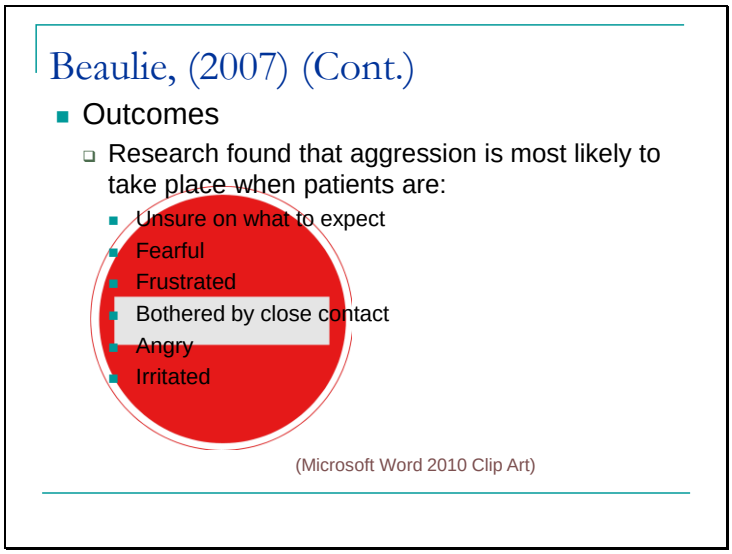

•A key piece of research came out of this study pointing out that aggression is most likely to take place when **patients do not know what to expect, are fearful, frustrated, bothered by close contact, angry, or irritated.**

The antecedent techniques we take from this data is that…

•An overall antecedent approach to patients with aggressive behaviors can be reducing these feelings by allowing the patient to have more control in the activity you wish them to partake in, talk about why they feel a certain way, take a break when the person is experiencing frustration, and incorporate calming/relaxation techniques that reduce stress and anger.

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Overall the literature shows a clear antecedent approach to use with individuals who have had a brain injury in the preventative effort to decrease agitation, aggression, and maladaptive behavior that deters from engaging in daily activities and participating in social/community activities.

•Antecedents include giving a person their personal space. Give them the object (toothbrush, toy, etc.) Back off and see what they can do, don't assume you will have to show them how to operate it

•Antecedent techniques involve the way we present ourselves to the patient and the environment in which we provide our therapies. So, introduce yourself if you are a healthcare worker or unfamiliar person for this individual, state the objectives/goals for your presence (i.e. why are you visiting them today?), give an initial demonstration of what you are asking the person to do, and most importantly- get on their level whether you lower yourself to their eye level or stand directly in eye sight. In general: build rapport (Giuffrida et al., 2009).

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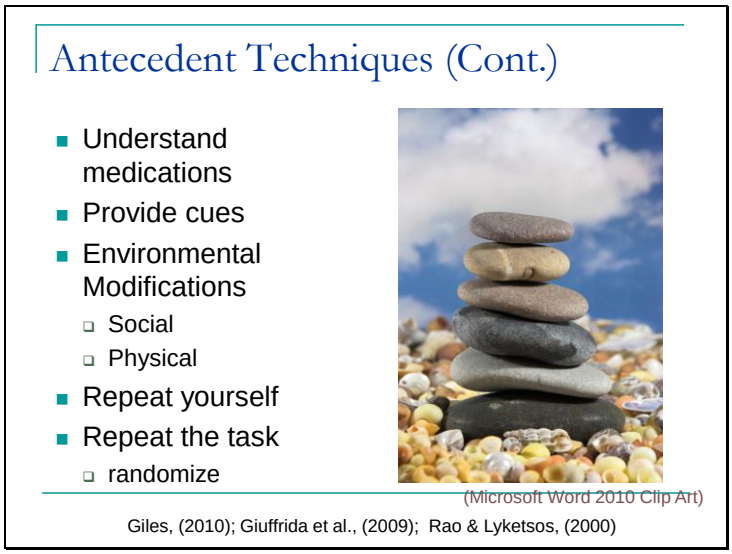
Techniques to Avoid
Using restraints
Harsh Punishment
Yelling
Rushing the individual
Using multiple steps
Speaking fast
Planning outings, etc. without paying attention to potential side effects of medications
Stating a command only once
Being "Touchy-Feely"
Crowds
Loud and/or sudden noises and movements
Brightly colored rooms (think neutrals!)
(Microsoft Word 2010 Clip Art)
Beaulie, (2007); Giuffrdia et al., (2009); Pace et al., (2005); Slifer & Amari, (2009)

Slide 97



•Some medications used to control aggressive behaviors agitation, irritability and other symptoms of TBI may have other side effects; be aware of them and how they affect your patient/loved one (Rao & Lyketsos, 2000).

•Retention and mastery of skills is promoted in individuals with a brain injury when the task is **repeated and using random repetition** (i.e. have the individual practice dressing, put on their shoes, etc. at random times throughout the day) more so than continuous back to back repetition (Giles, 2010).

•Similar, repetitive activities and allowing practice **enhances learning** in the TBI population (Giuffrida et al., 2009).

*The following examples on this slide are a few examples of antecedent approaches anyone can do with a little practice. With that, we will move into the skill building session of this workshop.

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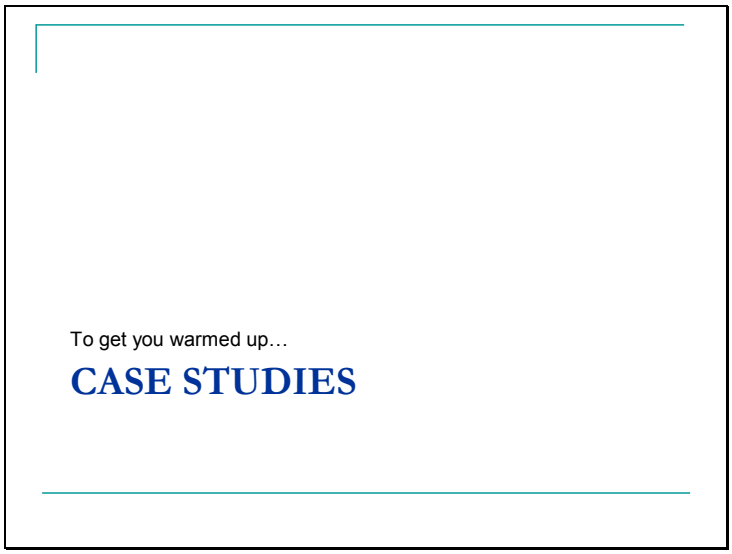

•Break the participants into groups of 3

•The number of persons in each group does not necessarily matter

•Each group is assigned a case study from their power point slides

•The workshop instructors will ask participants to read the case studies in their large groups and come up with antecedent techniques for their particular case.

•This can be done through role-playing, discussion, using personal experiences in relationship to the case study, or any other preferred method to engage in skill building.

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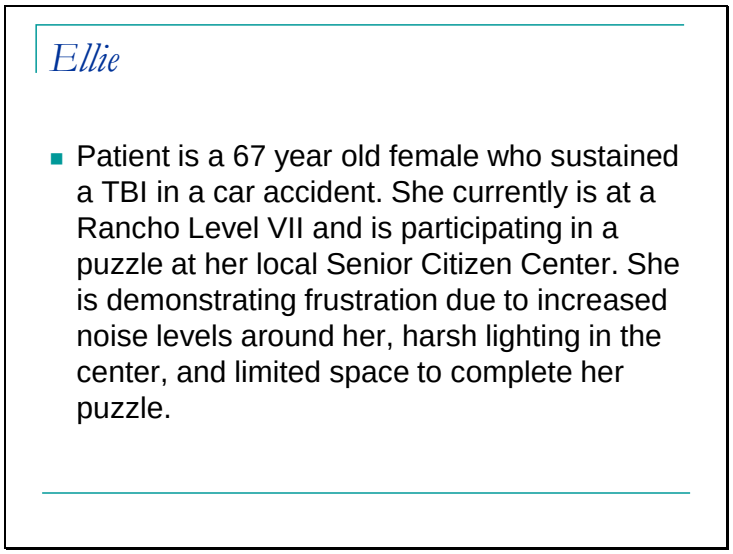
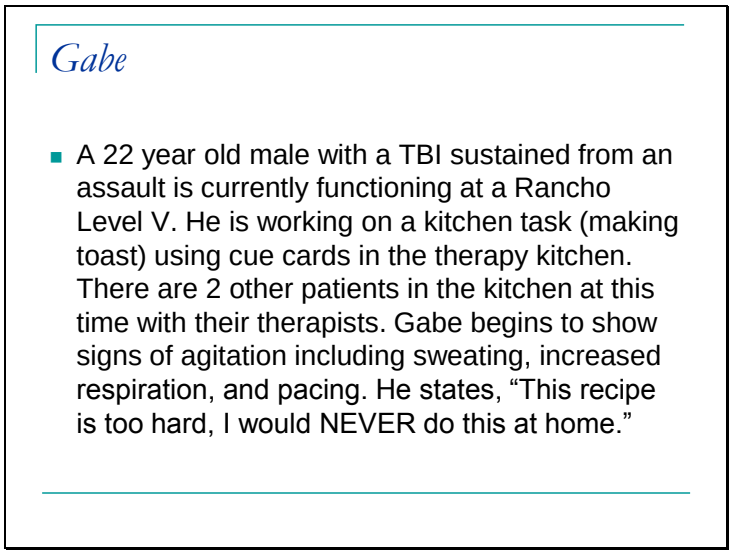


The appropriate responses will include: Ergonomic assessments/modifications, Structural modifications including lighting, noise, personal space

i.e. personal light over puzzle, move Ellie to separate larger table, Ask others around her politely to move, Sit her near a window for natural lighting, Find her a table to work at that is not centrally located near all the nose, provide ear plugs or a headset with calming music.

Slide 106



The appropriate responses will include: Remove him from the situation, Use a calm voice, Provide a calming sensory technique (deep breathing, imagery, isometric exercises), Explain the goals/objectives of why you are making toast, Ask him if he wants to take a break, etc.

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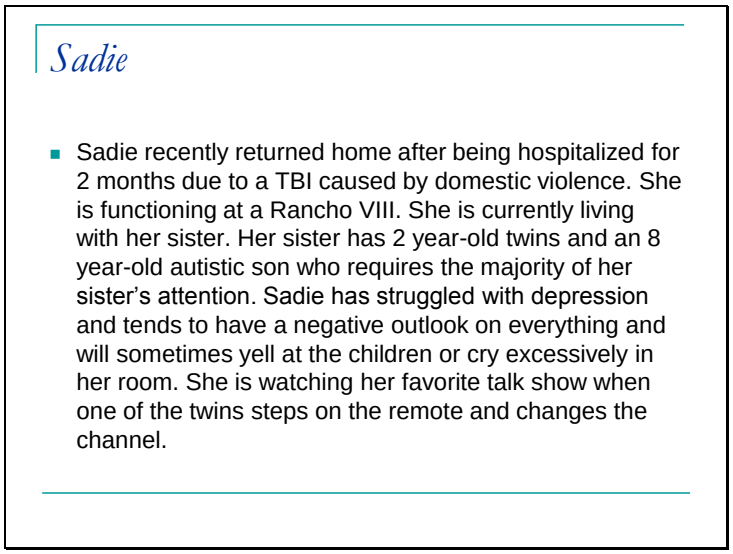

What can we do to make her stay more accommodating and positive for her?

The following are appropriate responses: Positive talk training, seeking help for depression, positive communication with sister, discussing a set time for her talk show where the distractions can be decreased or eliminated.

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