

Brain and Spinal Cord Injury

Anatomy | Careers | Injury Prevention

Student Workbook





The Reality of Accidents: Traumatic Spinal Cord and Brain Injury

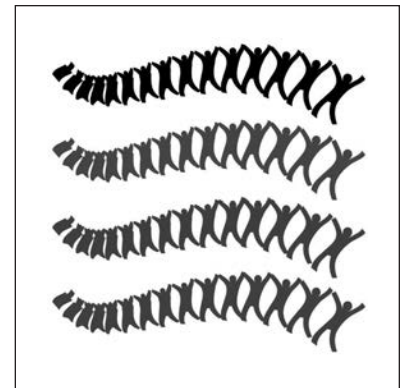


What You Will Do

- Hear the story of two teens who experienced traumatic injuries.
- Brainstorm about traumatic injury and prevention.

Why It's Important

- Traumatic injuries occur unexpectedly.
- They can happen to anyone.
- They often involved risky behavior.
- They can often be prevented.



Read the following statements and indicate whether they are true or false by circling T or F.



1. TALKING ON THE PHONE WHILE DRIVING is the cause of 25% OF ALL MOTOR VEHICLE ACCIDENTS.

T or F



2. 2 MILLION HIGH SCHOOL ATHLETES ARE INJURED YEARLY.

T or F



3. EVERY 41 MINUTES a person in the US sustains a SPINAL CORD INJURY.

T or F



4. EVERY FIVE MINUTES SOMEONE will become PERMANANTLY DISABLED due to BRAIN INJURY.

T or F



5. PEOPLE WHO TEXT WHILE DRIVING ARE 23% MORE LIKELY TO GET INTO A CAR ACCIDENT.

T or F



6. SIX OUT OF EVERY TEN SKATEBOARD INJURIES occur among CHILDREN UNDER THE AGE OF 16.

T or F

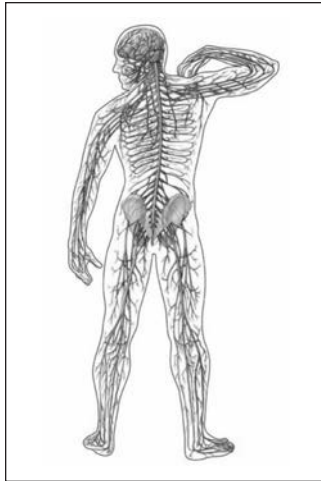


7. MOTOR VEHICLE CRASHES are the leading cause of DEATH for U.S. TEENS.

T or F



Get in the Know About Anatomy

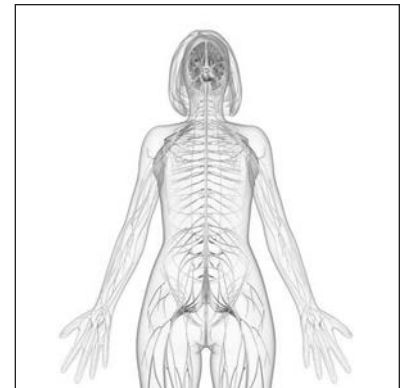


What You Will Do

- Learn about the anatomy of the brain and spinal cord.
- Understand terminology used to describe the brain and spinal cord.

Why It's Important

- The brain and spinal cord comprise the body's complex nervous system.
- They work together to help humans function.
- The brain and spinal cord have many parts that are vulnerable to traumatic injury.





One of the teens in your neighborhood has been seriously injured in a traumatic accident. Doctors say this teen may have a spinal cord and/or brain injury. Until testing and examination occur, you don't know which injury your neighbor has suffered. You are not sure what spinal cord injuries and brain injuries involve, so you decide to discover what they are and what such injuries mean for this teen's future. Think about this situation. Write down three things you think you will need to know to understand this teen's condition.

1. _____
2. _____
3. _____

Brain and Spinal Cord Terminology



Thoracic Section

Left Hemisphere

Occipital Lobe

Brain Stem

Vertebrae

Cervical Section

Nerves

Spinal Cord

Lumbar Section

Sacral Section

Right Hemisphere

Temporal Lobe

Frontal Lobe

Parietal Lobe

Central Nervous
System

Cerebellum


Brain Anatomy

Brain Hemispheres


The Brain is divided into two halves working together to command feelings, thoughts, and behaviors.

Left Hemisphere Controls



- 
- Movement of Right Side of Body
 - Reasoning
 - Speaking
 - Writing
 - Number Skills

Right Hemisphere Controls

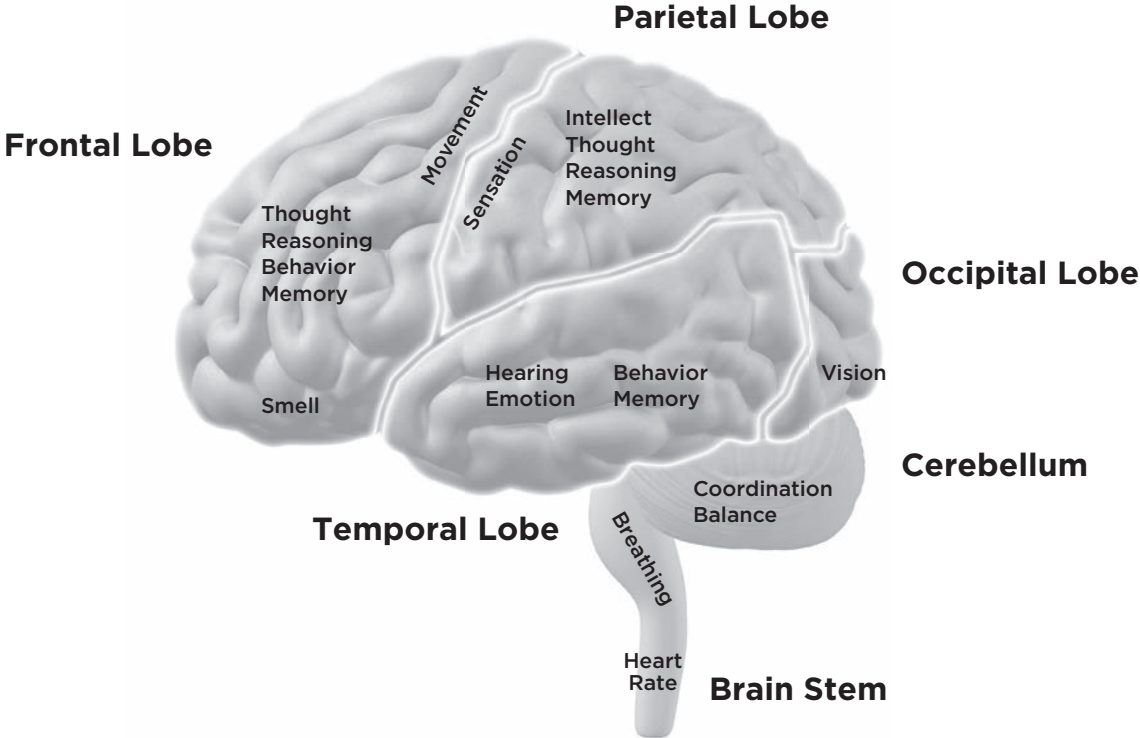
- 
- Movement of Left Side of Body
 - Insight
 - Imagination
 - Music/Art Skills
 - Awareness of Three Dimensions



Brain Anatomy

Brain Lobes and Functions

Each hemisphere of the brain is divided into smaller sections called LOBES. Each LOBE is responsible for specific kinds of activity. Plus the base of the brain consists of two additional parts, the Cerebellum and the Brain Stem. Notice that the Cerebellum resides underneath the lobes. The Brain Stem connects the spinal cord to the rest of the brain.

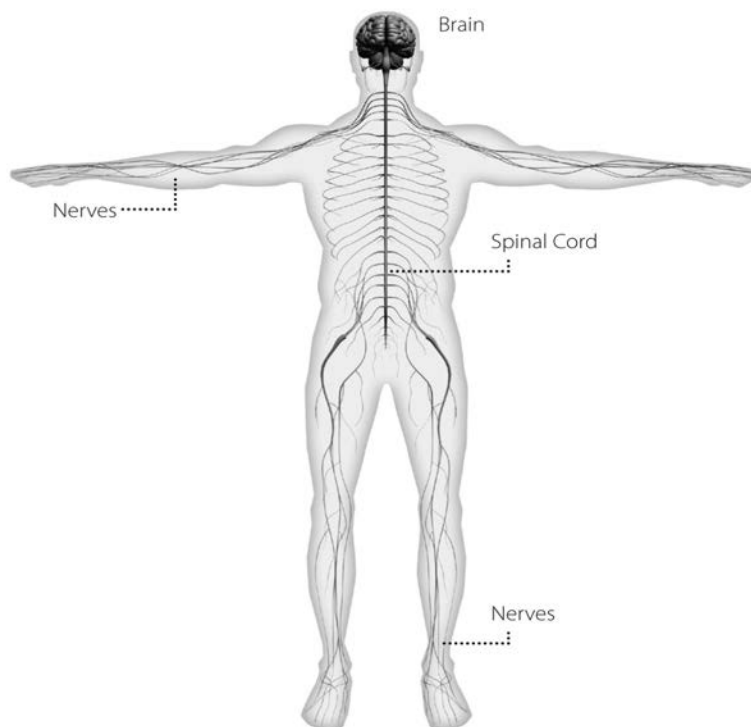


Cerebellum: resides underneath the lobes and is important for coordination and timing.

Brain Stem: connects the spinal cord to the rest of the brain and controls functions like breathing, blood pressure, and arousal (ability to respond to senses)

Spinal Cord Anatomy

Nervous System



The nervous system includes the **BRAIN**, **SPINAL CORD**, and **NERVES**. The spinal cord is a long column of nerves, and like the brain, is the consistency of a ripe banana. The spinal cord is much like a highway system, the nerves are like lanes of traffic and there are millions of lanes of traffic on the spinal cord. The brain sends and receives messages by way of the spinal cord and nerves (just like cars traveling north and south on a highway). The main messages are **MOTOR** and **SENSORY**. **MOTOR** messages help you do things like move your arms/legs, dance and balance. **SENSORY** messages help you feel things like pain, pressure, differentiate between hot and cold or rough and smooth. When someone sustains a spinal cord injury, it is like a wreck on the highway that closes down the system.

The spinal cord is surrounded by rings of bone called **VERTEBRAE**. Vertebrae are grouped into four sections along the spine.

Spinal Cord Anatomy



Cervical Section

7 Vertebrae

8 Pairs of Nerves

Nerves Exiting from the *cervical* section control

Neck

Face

Diaphragm (Muscles Controlling Breathing)

Elbows

Wrists

Fingers

An injury at the *cervical* level may also impact function to the nerves that exit below on the spinal column. An injury at the *cervical* level may also impact: function in the chest and abdomen, the hips, knees, legs and bowel and bladder control. The higher the injury on the spinal column, the more severe the impact for the patient.



Thoracic Section

12 vertebrae

12 pairs of nerves

Nerves exiting for the *thoracic* section control

Chest

Abdomen

Back muscles

An injury at the *thoracic* level may also impact function to the nerves that exit below on the spinal column. An injury at the *thoracic* level may also impact: function in the hips, knees, legs and bowel and bladder control.

Spinal Cord Anatomy



Lumbar Section

5 vertebrae

5 pairs of nerves

Nerves exiting from the *lumbar* section control

Hips

Knees

Feet (movement upward)

Toes

An injury at the *lumbar* level may also impact function to the nerves that exit below on the spinal column. An injury at the *lumbar* level may also impact: function in the feet and bowel and bladder control.



Sacral Section

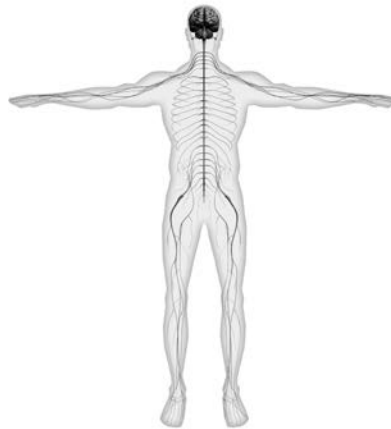
5 fused vertebrae

5 pairs of nerves

Nerves exiting from the *sacral* section control

Feet (movement downward)

Bowel and bladder control



Get in the Know About Anatomy

1. What three parts of the body comprise the nervous system?

2. The brain sends and receives two kinds of messages. Describe what each kind of message helps the body to do:

A. Motor messages:

B. Sensory messages:

3. The spinal cord is like a highway system.

It carries the messages to and from the _____. Its consistency is mushy like a _____.

4. Nerves within the spinal cord are much like traffic lanes on a highway.

How many of these “traffic lanes” exist within the spinal cord? _____

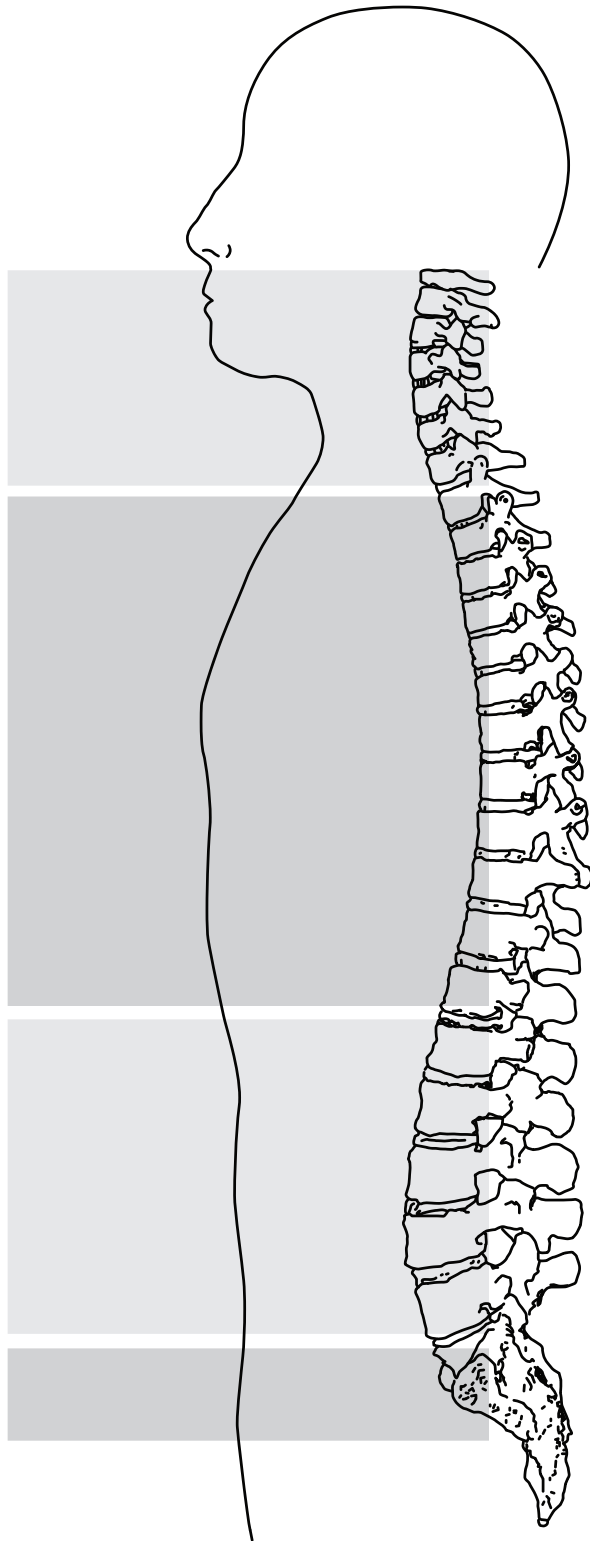
5. The messages carried by the nerves are like _____ traveling north and south along the highway.

6. A spinal cord _____ is much like a car wreck on the highway because it

Student Task

7. The rings of bone that surround the spinal cord are called _____.

On the left side of the chart below, label the four sections of the spinal cord, number the **vertebrae** within each section. On the right side of the diagram, list the main body parts affected by spinal cord injury within that section.

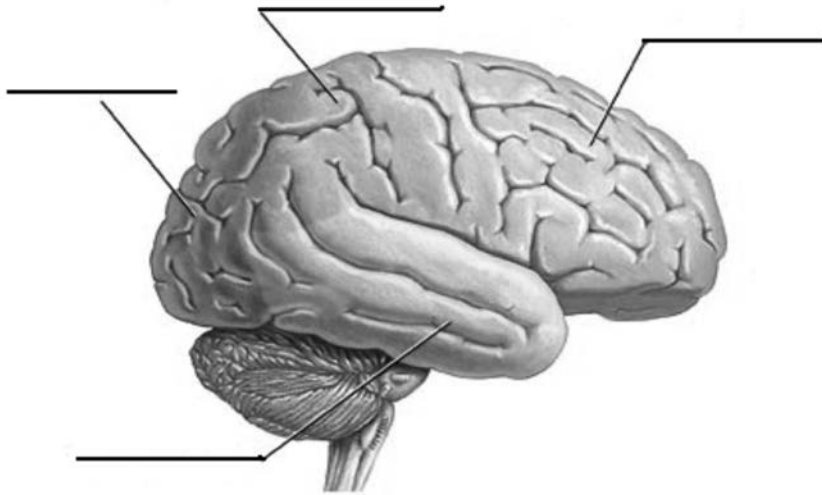


Task 2: Know Your Brain

Student Task

1. The brain is divided into two halves. What is each half called and what general functions does each control?

2. Each brain is divided further into smaller sections called **lobes**. Label each lobe in the brain illustration below. Beside the illustration, describe the primary function of each lobe.



3. Where is the **cerebellum**, and what function does it perform?

4. Where is the **brain stem**, and what does it control?

Task 3: Know Your Anatomy Terminology

Student Task

Review the 16 terms that describe brain and spinal cord anatomy. Be sure you have the correct definition for each term.

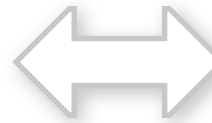
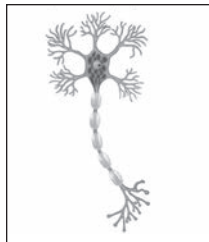
Analogy Challenge

Analogy: An analogy is a comparison between two things that at first may seem very different from each other but actually share similarities. The job of the analogy is to explain that similarity.

Verbal Analogy: Create a sentence that explains your comparison.

Example: *Nerves are like **UPS men** because they both deliver, the nerves deliver messages, the UPS men deliver packages.*

Visual Analogy: Draw pictures that represent your comparison. Then explain how they are alike.



Both
Deliver
Either
Messages or
Packages

Your Challenge: Select 3 brain or spinal cord terms and create a visual or verbal analogy modeled after the examples above:

Be as creative as possible. Surprise your classmates with comparisons they would not expect.

Analogy 1:

Analogy 2:

Analogy 3:

**Spinal Cord and Brain Anatomy Terms
Magic Square**

A	B	C	D
E	F	G	H
I	J	K	L
M	N	O	P

Directions: Match the word to its definition by placing the correct number of the definition in the square with the letter that represents the term it defines. When the magic square is correctly completed, each row, column and diagonal will add to the number 34.

Medical Terms

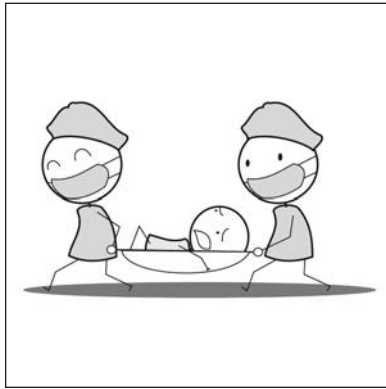
- A. Brain Stem
- B. Nervous System
- C. Cerebellum
- D. Cervical Section
- E. Frontal Lobe
- F. Left Hemisphere
- G. Lumbar Section
- H. Nerve
- I. Occipital Lobe
- J. Parietal Lobe
- K. Right Hemisphere
- L. Sacral Section
- M. Spinal Cord
- N. Temporal Lobe
- O. Thoracic Section
- P. Vertebrae

Definitions

- 1. Rings of bone surrounding the spinal cord
- 2. Brain, spinal cord and nerves; controls and coordinates activities of the body
- 3. Brain part that controls coordination and timing
- 4. About 18" long; the communication system between brain and body; carries messages that allow us to move and feel
- 5. Brain part that mainly controls memory, judgment, behavior
- 6. Brain half responsible for insight, imagination, music/art skills and awareness of three dimensions
- 7. Brain part that controls sensation, movement, sense of space
- 8. Each has a special job for movement and feeling; tell body parts how and when to move; also carry messages to the brain
- 9. Interprets what we see
- 10. Five (5) vertebrae in lower back; affect hips and legs
- 11. Brain half that controls reasoning skills, speaking, writing, and number skills
- 12. Comprised of 5 vertebrae at the end of the spinal column
- 13. Comprised of 8 vertebrae in the neck; affect arms, hands, trunk and legs
- 14. Brain part that controls language, emotion, memory skills
- 15. Twelve (12) vertebrae in the mid-back; affect trunk and legs
- 16. Connects brain to spinal cord; controls breathing, blood pressure and arousal



Traumatic Brain Injury (TBI) and Spinal Cord Injury (SCI)



What You Will Do

- Learn medical terminology used to describe TBI and SCI.
- Understand how doctors categorize TBI and SCI injuries.
- Realize the serious impacts associated with TBI and SCI.

Why It's Important

- Traumatic injuries like TBI and SCI are serious and can cause lasting damage.
- Traumatic injuries can often be prevented.
- Every traumatic injury is different and every patient's experience is unique.



Introduction to Traumatic Brain Injury

What is a Traumatic Brain Injury?

Traumatic brain injury (TBI) is caused by a blow to the head or violent movement of the head. No open head wound or skull fracture or loss of consciousness is required for an injury to be classified as a TBI.

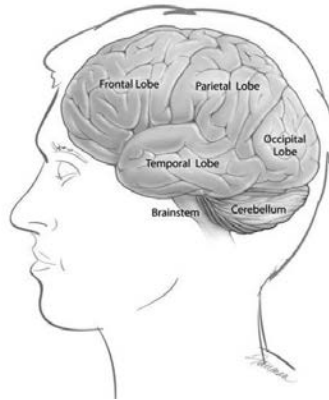
How Do Doctors Explain the Severity of a TBI?

Three factors help doctors explain the severity of a traumatic brain injury to patients and their families:

- A. Location of the injury
- B. Loss of consciousness
- C. Level of response

A. Location of Injury

Injury can occur to any part of the four brain lobes, the cerebellum or the brain stem. The injury may result in brain bleeding, swelling, tearing of the nerve tissue, compression of the nerve tissue and increased intracranial pressure in the injured area.



B. Loss of Consciousness

Doctors classify traumatic brain injury as **Mild, Moderate, or Severe**. To determine the classification, doctors consider the length of time the patient lost consciousness and the mental status of the patient once consciousness is regained.

The chart below details these classifications.

TBI Classifications	
Mild TBI	Often Called A Concussion Injured Person Experiences Any Of The Following: Loss Of Consciousness For 15 Minutes Or Less Any Memory Loss Feeling Dazed, Disoriented, Or Confused
Moderate TBI	Loss Of Consciousness For 15 Minutes To A Few Hours Days Or Weeks Of Confusion
Severe TBI	Loss Of Consciousness For 6 Hours Or Longer May Be In A Coma

C. Level of Response

The Glasgow Coma Score (GCS) measures the responses or lack of responses of a person experiencing traumatic brain injury (TBI). The information this test provides also helps doctors determine the level of a brain injury.

Glasgow Coma Score (GCS)

Body Function	Patient Response	Patient Score
Best Eye Response (earn a score of 1 to 4)	<ol style="list-style-type: none"> 1. No eye opening 2. Eye opening to pain 3. Eye opening to verbal command 4. Eyes open spontaneously 	
Best Verbal Response (earn a score of 1 to 5)	<ol style="list-style-type: none"> 1. No verbal response 2. Incomprehensible sounds 3. Inappropriate words 4. Confused 5. Orientated 	
Best Motor Response (earn a score from 1 to 6)	<ol style="list-style-type: none"> 1. No motor response 2. Extension to pain 3. Flexion to pain 4. Withdrawal from pain 5. Localizing pain 6. Obeys commands 	
	Total	

The patient's response in each category is given a point value. These numbers are added together to get the patient's total score. The total score is interpreted using the following scale:

13 or higher = Mild

9-12 = Moderate

8 or less = Severe

The GCS score combines with loss of consciousness (LOC) information to determine the patient's TBI level.

GCS and LOC Prediction of Severity

Severity Rating	GCS Score	LOC
Mild	13 or higher	15 minutes or less
Moderate	9 to 12	Over 15 minutes to a few hours
Severe	8 or less	6 hours or more

What are the Impacts of a Traumatic Brain Injury?

Traumatic brain injury patients experience a wide range of impacts. Each patient is different; each injury produces different results. The list below provides a general description of potential impacts. Patients do not necessarily experience all the impacts listed.

It is important to remember that, regardless of which specific impacts patients experience, the impacts of traumatic brain injury are serious and lasting.

Physical:

- Difficulty with
 - Movement
 - Speaking
 - Swallowing
 - Balance
 - Walking
- Regulations of vital signs -heart rate, blood pressure, breathing
- Difficulty with sensory perception
- Headaches
- Blurred vision/double vision
- Seizures
- Difficulty with bowel and bladder control – typically related to “aphasia,” meaning an inability to process information due to brain injury
- Changes in sleep patterns

Emotional:

- Lack of insight and understanding about the injury
- Depression
- Anger
- Anxiety
- Agitation/impatience
- Personality changes
- Mood swings

Cognitive:

- Confusion
- Memory impairments/forgetfulness
- Difficulty forming sentences/finding vocabulary
- Difficulty thinking logically/reasoning/focusing
- Difficulty concentrating

Daily Living/Behavioral:

- Socially inappropriate behavior
- Impulsivity
- Poor social skills
- Excessive talking
- Dependent on others for help and care

Task 4: Know How Doctors Talk About Traumatic Brain Injury

1. What causes a brain injury?

2. In order to have a brain injury there must be an open head wound or skull fracture. True or False

3. What three factors help doctors explain the severity of a TBI?
 A. _____ B. _____ C. _____

4. Doctors classify TBI as mild, moderate or severe. The length of time an injured person loses consciousness is one factor that helps determine the level of severity. What is the LOC (loss of consciousness) time for each of the three levels?
 - Mild: _____
 - Moderate: _____
 - Severe: _____

5. The Glasgow Coma Score evaluates three kinds of responses for TBI patients. List the three kinds of responses tested:
 - A. _____
 - B. _____
 - C. _____

6. Consider the condition of the two patients described below. Identify the level of TBI for each. Remember to look at both the loss of consciousness time (LOC) and the Glasgow Coma Score to make this determination.
 - A. John lost consciousness for 1 hour and has a GCS Score of 11. Is his TBI level mild, moderate, or severe?

 - B. Mary lost consciousness for 8 hours and has a GCS Score of 5. Is her TBI level mild, moderate, or severe?

Student Task

7. **TBI Impacts:** Consider the physical, emotional, cognitive and daily living/behavioral impacts for TBI. Which ones do you think present the greatest challenges to patient with a TBI? Select one challenge from each category and explain your choices.

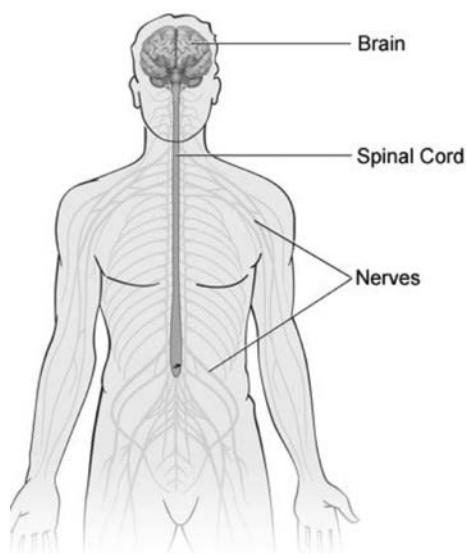
Physical:

Emotional:

Cognitive:

Daily Living/Behavioral:

Introduction to Spinal Cord Injury



Introduction to Spinal Cord Injury

The nervous system includes the BRAIN, SPINAL CORD, and NERVES. The spinal cord is a long column of nerves, and, like the brain, is the consistency of a ripe banana. The spinal cord is much like a highway system, the nerves are like lanes of traffic and there are millions of lanes of traffic on the spinal cord. The brain sends and receives messages by way of the spinal cord and nerves (just like cars traveling north and south on a highway). The main messages are MOTOR and SENSORY. MOTOR messages help you do things like move your arms/legs, dance and balance. SENSORY messages help you feel things like pain, pressure, differentiate between hot and cold or rough and smooth. When someone sustains a spinal cord injury, it is like a wreck on the highway that closes down the system.

What is a Spinal Cord Injury?

Spinal cord injury is any damage to the spinal cord which blocks communication between the brain and the body. Because of the injury (like a wreck on the body's highway system) sensory messages are not able to reach the brain and the brain cannot tell the muscles below the injury (or wreck) how or when to move.

How Do Doctors Explain the Severity of a SCI Injury?

Four descriptions of the patient's injury help doctors explain the severity of a spinal cord injury to patients and their families:

- A. The level (location on the spine) of the injury
- B. The amount of damage to the spinal cord
- C. Extent of paralysis
- D. The ASIA Scale score

A. Level of Injury

The level of an injury is described according to the section of the spine where the damage occurs. This description consists of two details about the injury: 1) section of the spinal column; 2) number of the affected spinal nerve/vertebrae. *Doctor Speak: Doctors describe an injury near the 3rd vertebrae/nerve as a "C3 cervical injury."*

Two important facts about vertebrae and nerves:

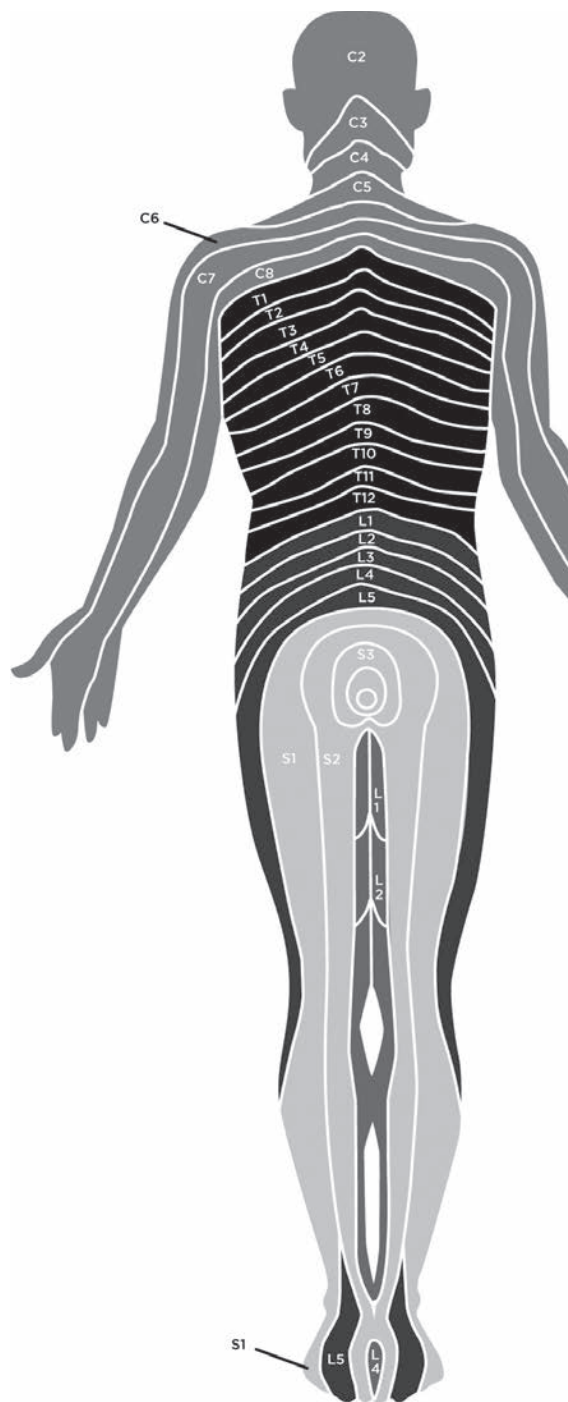
- 1. Vertebrae and nerve numbering:** The spinal nerves branch out from each side of the vertebrae and these pairs of nerves are numbered according to the "vertebrae from which they extend. Each section of the spinal has an equal number of vertebrae and nerves except for the cervical section which has 8 pairs of nerves for its 7 vertebrae.
- 2. Nerve function:** After an injury all nerves below the level of the injury are unable to communicate with the brain and can no longer do their work.



A. Level of Injury, continued

This figure at left shows the areas of the body affected by damage to each section of the spinal cord. Remember this *damage is both motor and sensory*.

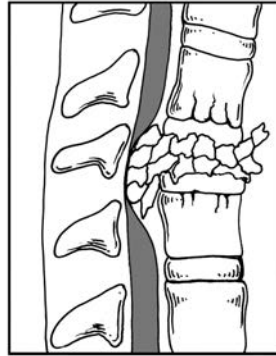
The chart below describes the movements affected by an injury at each of the vertebrae in the spinal column. Remember the injury level (location) affects everything below that level. Notice the significant amount of movement affected by an injury at the *cervical* level.



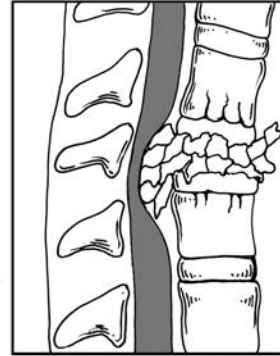
INJURY LEVEL	AFFECTED MUSCLES/MOVEMENT
C-1 to C-2 (Cervical)	Neck and face movement
C-3 to C-4	Diaphragm movement (breathing muscle)
C-5	Elbow bending
C-6	Wrist extension (bending wrist upward)
C-7	Elbow straightening
C-8	Finger movement
T-1 to T-12 (Thoracic)	Control of chest, abdomen (stomach area) & back muscles
L-1 to L-2 (Lumbar)	Hip bend (flex)
L-3	Knee straightening
L-4	Bend foot upward
L-5	Extends toes
S-1 (Sacral)	Bend foot down toward floor
S-2 thru S-4	Areas for urinating & bowel movements

B. Damage to the Spinal Cord

Doctors describe the amount of damage to the spinal cord using two terms: **COMPLETE** or **INCOMPLETE**.



COMPLETE



INCOMPLETE

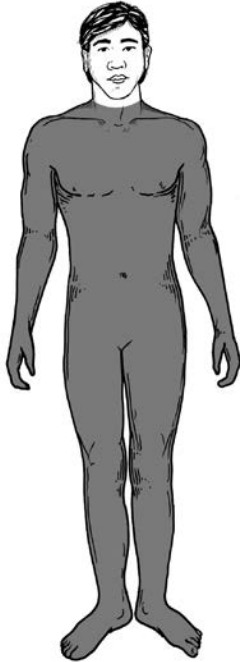
Complete Injuries: Complete injuries cause damage that extends through the entire spinal cord. This would be like a wreck that shuts down ALL lanes of traffic. No messages are able to get around the injury. This type of injury means the patient has no movement (motor ability) or feeling (sensory ability) below the injury, and is unable to control bowel or bladder.

Incomplete Injuries: Incomplete injuries cause partial damage to the spinal cord. This would be like a wreck on the highway that shuts down a few lanes of traffic, but not all. Some messages may be able to get around the injury. This type of injury means the patient may have some movement or feeling below the injury. Incomplete injuries vary greatly from patient to patient depending on the degree of damage to the spinal cord.

Example of injury differences: *Two patients can have an incomplete injury at the same location, perhaps at C3. The first patient may be able to walk, use their hands and control their bladder and bowel while another patient with an incomplete C3 injury may have no feeling or movement below their neck. Again, it depends on which “lanes” in the spinal cord “highway” are closed down completely.*

Paralysis

Paralysis is defined as loss of voluntary movement as a result of damage or injury. Spinal cord injuries result in two types of paralysis.



Tetraplegia/Quadraplegia:

An injury to the *cervical* region will result in tetraplegia/quadraplegia. This will result in loss of movement and sensation in both arms and both legs, and loss of control over bowel and bladder.

The areas of the body that are affected are shaded.



Paraplegia:

An injury to the *thoracic, lumbar, or sacral* region will result in paraplegia. This will result in loss of movement and sensation in both legs, and loss of control over bowel and bladder.

The areas of the body that are affected are shaded.

D. The ASIA Scale Score

The American Spinal Cord Injury Association (ASIA) has five classifications describing the extent of spinal cord injury described by the chart below.

These classifications are called an ASIA Scale score. The patient’s motor and sensory functions determine the patient’s score on the scale. Patients with the most severe injury have a score of “A.” Patients with no injury have a score of “E.”

ASIA SCALE

Asia A	The patient has no feeling or movement below the level of the injury.	Classified as a Complete Spinal Cord Injury
Asia B	The patient has some feeling below the level of the injury but no ability to control movement.	Classified as an Incomplete SCI
Asia C	The patient has feeling or movement in less than 50% of the body below the level of the injury.	
Asia D	The patient has feeling or movement in more than 50% of the body below the level of the injury.	
Asia E	The patient has ability to feel and move throughout the body.	

Describing a Spinal Cord Injury – Looking at real cases:

1. When doctors talked to a young girl named Mary and her parents, they explained that Mary had a complete C3 Cervical injury classified as an ASIA A level. They said that Mary’s injuries have resulted in tetraplegia. Her condition is not likely to change for the rest of her life.
2. When doctors talked with a young man named Max and his parents, they explained that Max had an incomplete T7 Thoracic injury classified as an ASIA C. Thus, Max’s injuries have resulted in paraplegia; however, the doctors said they cannot predict how much functional improvement Max might experience.

Notice: Each explanation above references the four conditions that describe spinal cord injuries.

- A. The level (location on the spine) of the injury
- B. The amount of damage to the spinal cord
- C. Extent of paralysis
- D. The ASIA Scale score

What are the Impacts of a Spinal Cord Injury?

Spinal cord injury patients experience a wide range of impacts. Each patient is different; each injury produces different results. The list below provides a general list of potential impacts. Patients do not necessarily experience all the impacts listed.

Impacts can be categorized as physical, emotional, and daily living.

It is important to remember that, regardless of which specific impacts patients experience, the impacts of spinal cord injury are serious and lasting.

Physical:

- Paralysis – inability to control motor and sensory function
- Weakened muscles above the location of the injury
- Weakened breathing or inability to breathe without a machine called a ventilator
- Inability to cough – must have assistance to do so
- Inability to control bowel and bladder – must have assistance to do so
- Inability to control body temperature and blood pressure – requires constant monitoring



Emotional:

- Depression
- Anger
- Anxiety

Daily Living:

- Requiring a wheelchair for the rest of life
- Dependent on others for personal grooming and toilet use
- Dependent on others for dressing
- Dependent on others for food

Task 5: Know How Doctors Talk About Spinal Cord Injury

1. A spinal cord injury is caused by any damage that blocks _____

2. **Level of injury** is described using a letter and a number. Explain what the letter and number represent in each of the following examples.

C-5 _____

T-8 _____

3. The **level of injury** also affects the patient's ability to move below that level. Use the Injury Level/Affected Movement chart on page 23 to respond to the following:

- | | | | |
|---|------|----|-------|
| a. C4 injury will affect the patient's ability to breathe. | True | or | False |
| b. T5 injury will affect the patient's ability to bend at the hips. | True | or | False |
| c. L5 injury will affect the patient's ability to move the fingers. | True | or | False |
| d. All injuries will affect the patient's bowel and bladder function. | True | or | False |

4. Doctors also describe the **degree of injury** to the spinal cord. Describe the difference between the two types of spinal cord damage.

Complete _____

Incomplete _____

5. The extent of the paralysis is described as either **tetraplegia** or **paraplegia**.

Tetraplegia results when the injury is to the _____ section of the spinal cord. Patient's with tetraplegia experience:

Paraplegia results when the injury is to the _____ section or lower in the spinal cord. Patient's with paraplegia experience:

Student Task

6. The **ASIA Scale Score** has five levels of classification describing the extent of motor and sensory impairment.

All patients with a complete spinal cord injury have an ASIA grade of _____. This grade means the patient has no _____.

Patients with an incomplete spinal cord injury could have an ASIA grade from _____ to _____.

Explain the difference between a grade B and a grade C on the ASIA:

7. SCI impacts. Consider the physical, emotional, and daily living impacts for SCI. Which ones do you think present the greatest challenges to SCI patients. Select one challenge from each category and explain your choices.

Physical:

Emotional:

Daily Living:



TBI and SCI Case Studies in the Trauma Center



What You Will Do

- “Meet” your case study teen. Each story is fictional but based upon real injuries experienced by real teens.
- Read the story describing how the teen was injured.
- Read the medical report describing the teen’s injuries.
- Apply your knowledge of TBI and SCI to determine the severity of your case study teen’s injuries.
- Begin creating an exhibit about your case study teen.

Why It’s Important

- Traumatic injuries like TBI and SCI are serious.
- The consequences of TBI and SCI can be life changing.
- Traumatic injuries can often be prevented.



Caylee's Story - TBI Case Study



Here's What Happened

Caylee was an eighth grader who lived half a mile from her best friend Britney. After school and on the weekends Caylee and Britney often rode bikes to each other's houses to study, hang out or ride around the neighborhood. Caylee had a helmet and was supposed to wear it whenever she rode her bike, but she hated wearing it. It looked stupid and always messed up her hair. She would die if she ever ran into any of the guys she knew while she had the helmet on.

When she was going out to ride, she would make a show of wearing the helmet in front of her parents, but took it off once she was off their street. She would then buckle the helmet to the seat of her bike and leave it there till she was almost back home.

One Thursday she headed out to Britney's after school. They were going to ride around for a little while and then watch TV at Britney's house. Caylee didn't have to pretend to wear her helmet that day. Her mom was out running errands and her dad was at work. She rode towards the bottom of her street. There was a two way stop at the intersection, and she slowed her bike as she approached. She didn't see any cars coming, so she kept on through the intersection without stopping. But there was a car coming that was obstructed by a parked car. Caylee missed it when she looked. The car struck the front of her bike and Caylee was thrown on to the street. Her face and head hit the pavement and she was knocked unconscious. The driver of the car called 911. An ambulance came quickly and took Caylee to the nearest trauma center.

Caylee's Condition - What The Doctors Found

1. Caylee was unconscious for 90 minutes.
2. Caylee had injured both the frontal and temporal lobes on both sides of her head. There was bleeding in her brain in both of these areas.
3. Caylee was tested for three kinds of responses. Here are the results:
 - Eye Response = Caylee opened her eyes when someone tells her to do so.
 - Verbal Response = When asked questions her responses were inappropriate with words that made no sense.
 - Motor Response (Movement) = She could obey verbal commands. When her mom asked her to give a thumbs up she could do it.
4. Caylee could breathe on her own.
5. Caylee had the physical ability to eat and go to the bathroom normally, but did not remember that she needed to do these things or how to do them. If she was not taken to the bathroom every two to three hours, she would have an accident. Someone had to help her eat every meal.
6. Caylee was often agitated and confused. She sometimes had outbursts and aggressive behavior that she did not ever have before she was hurt.
7. Caylee had the physical ability to walk, but would easily get lost and would not know how ask for directions. She was very unsteady and had to be in a wheelchair unless nurse, therapist, or family member was with her.
8. Caylee had difficulty recognizing certain family members.

Trey's Story - TBI Case Study



Here's What Happened

Trey was a seventh grader who everyone knew was a daredevil. He was an avid skateboarder who always did the hardest tricks and did them well. One Saturday afternoon he was at the skate park with a few older kids. One of them, Aiden, had a 4-wheeler that he had gotten for his birthday. He rode around on the paved paths by the skate park while the other guys skated. When Trey saw Aiden driving around, he had an idea. "Hey Aiden!" he yelled. "Pull me on my board!"

Aiden stopped the 4-wheeler and waited for Trey to catch up to him. The 4-wheeler had a tow rope in its storage compartment. They tied it up and Trey grabbed the other end. Aiden pulled out of the dirt and onto the paved pathway. Trey hooted and hollered as the ATV picked up speed. As they came to a bend in the path, the ATV was going too fast and Trey couldn't hold on to the rope anymore. The 4-wheeler went one way, and Trey flew off the path into the embankment. He hit his head hard on the ground when he landed. It was clear to everyone that he was badly hurt and appeared unconscious. He had a bleeding head wound. Several people called 911. The paramedics showed up within minutes and took Trey away in an ambulance to the ER.

Trey's Condition - What The Doctors Found

1. Trey was unconscious and in a coma for 25 days.
2. Trey had injured his occipital lobe and his brain stem. There was bleeding in his brain (subdural hematoma). There was extensive swelling in his brain (edema). His skull was fractured. He required an ICP (intracranial pressure) monitor.
3. Twenty-five days after his accident, Trey started to show some response. He was tested for three kinds of responses. Here are the results:
 - a. Eye Response = His eyes opened only to pain.
 - b. Verbal Response = No verbal response.
 - c. Motor Response (Movement) = His arm extended when a painful area was touched (Extension to pain).
4. Trey was unable to breathe on his own so a machine called a ventilator helped him breathe.
5. Trey could not chew and swallow food so he had to be fed through a tube.
6. Trey could not control his bowels or bladder. He required adult diapers.

Maya's Story - TBI Case Study



Here's What Happened

Maya was a seventh grader who always worked hard to stay ahead in school. She knew she wanted to be a doctor one day and her teachers all told her that meant she had to always get good grades in every class. She had been able to maintain an "A" average for as long as she could remember and just knew she'd get into the best college one day. She also didn't mind going to school like some of the other kids she knew. She liked seeing her friends and liked learning new things.

Maya lived in a neighborhood just across the street from her school. Because she lived so close, she always walked to school. There is a crosswalk from the intersection of her street that leads right to the front of the school and Maya always used it.

One day she was heading out of school toward home, and was texting one of the girls in her history class about a project they were doing together. She saw the light turn green, looked back down at her phone and started to walk forward into the crosswalk. But she didn't see that a car was coming too quickly from the other direction, trying to make it through a yellow traffic light. The car struck Maya and she was thrown into the street.

She had cuts and scrapes, but was not bleeding from her head. However, she was not conscious and was not moving. An ambulance came and took Maya to the hospital.

Maya's Condition - What The Doctors Found

1. Maya was unconscious for three 3 hours.
2. Maya had injured the frontal, parietal and temporal lobes on the right side of her head. There was bleeding in her brain in all three of these areas. She had a closed head injury, however the doctors had to drain blood from the inside of her skull and had to remove part of it on the right side to relieve pressure on her brain.
3. Maya was tested for three kinds of responses. Here are the results:
 - a. Eye Response = Maya opened her eyes spontaneously. No one had to tell her to open her eyes.
 - b. Verbal Response = She had no verbal response.
 - c. Motor Response (Movement) = She could sometimes obey verbal commands. When the doctor asks her to give a thumbs up she could do it most days.
4. Maya could not breathe on her own at first. She had to be placed on a ventilator but was able to stop using it after about two weeks.
5. Maya had to have a feeding tube. The doctors think she will physically be able to eat in the future, but may still need help to remember how and when to do it.
6. Maya was often agitated and confused. She sometimes had outbursts and aggressive behavior that she did not ever have before she was hurt.
7. Maya had the physical ability to walk, but could easily get lost and would not know how ask for directions.
8. Maya had difficulty recognizing certain family members.

Kendrick's Story - SCI Case Study



Here's What Happened

Kendrick was a 14-year-old eighth grader who was a good student and never got into trouble. He played on the basketball team and ran track. In his free time he loved to ride his dirt bike with his friends in a place they called "The Dunes" where there were lots of dirt hills for jumps and tricks. Kendrick was one of the best at tricks – a real natural. He always seemed in control of his bike and had a lot of fun riding.

One Saturday Kendrick met two of his friends to ride the Dunes. Kendrick never wore a helmet when he rode because he felt like he knew what he was doing and would be fine without it. Today was no exception. The boys had only been riding for a few minutes when Kendrick decided to go for some freestyle jumps. He started at the top of a small hill, revved his bike and sped toward a much bigger hill to make a jump. He sailed into the air, but as he came back down something went wrong. Instead of a clean landing, Kendrick came back at an angle, landing in the dirt and ending up with his bike on top of him. He didn't get up after he hit the ground and his friends knew something was wrong. They ran to him and he told them he couldn't move anything and he struggled to breathe. His friends called 911 and kept him talking. Some of his teeth had been knocked out in the fall. Soon a helicopter arrived and the paramedics carefully stabilized Kendrick's neck and transported him to the hospital.

Kendrick's Condition - What The Doctors Found

1. Kendrick never lost consciousness.
2. Kendrick fractured his spine at C3 and C4.
3. Kendrick had a complete C3-4 spinal cord injury.
4. Kendrick could not feel or move anything below his shoulders at the level of his injury.
5. Kendrick went into respiratory failure shortly after his accident and had to be put on a ventilator.
6. Kendrick had to have a feeding tube because he couldn't swallow properly.
7. Kendrick could not control his bowels or bladder.

Rico's Story - SCI Case Study



Here's What Happened

Rico, a high school freshman, had been training since August for this year's wrestling season; running 2 miles a day, eating all the high protein foods Coach recommended, lifting weights and focusing on improving his speed on the mat during matches. His win/loss record for matches was gradually improving, and he was proud of his record! Although he was technically on the JV team, he was sometimes selected to wrestle a varsity opponent if there was no varsity wrestler from his team available in his weight class. He was looking forward to the school's annual invitational wrestling tournament the following weekend, since many of his friends, family and girlfriend, Susanna, would be there to cheer for him and his teammates.

It was his second match of the day, and he would be wrestling as a varsity member of the team. His opponent, Joe, was a senior, obviously with more experience on the mat. They each took neutral positions and started the footwork, moving in circles. Suddenly Joe grabbed Rico's legs below the knees and forced him down to the mat. Rico managed to get onto all fours, literally carrying Joe, and fought to keep his face up, as his coach kept urging him to do. Joe worked to get Rico back onto his back, to pin him as quickly as possible. The ref circled the boys, on his knees, checking to see if Rico's shoulders were indeed touching the mat, the requirement for a "pin." Rico arched his back, forcing Joe to push his chest into Rico's. The crowd roared and both coaches shouted words of encouragement. Rico was giving it his all against his more experienced opponent. Using all the upper body strength he could muster he managed to reverse his position with Joe's, earning the first point of their match!

Joe was surprised and incensed as they began the second two-minute round of the match. Once again he managed to force Rico to the mat within seconds. This time Joe locked his hands around Rico's neck, in order to force Rico onto his back. The ref was about to call the illegal move, but before the ref could make the call Joe thrust Rico onto the mat, chin first, forcing his neck to move past the normal range of motion. His neck had been hyper extended. The crowd's enthusiastic shouting gradually stopped as everyone realized Rico was not moving. Both coaches sprinted to the mat. Rico's mother came rushing down to the gymnasium floor, calling for Rico to respond.

Rico's Condition - What The Doctors Found

1. Rico had a fracture at his C-7 vertebrae and had significant swelling of his spinal cord.
2. Rico was able to breathe on his own.
3. Rico was unable to move anything below his level of injury but he had some sensation in his bottom and legs.
4. Rico could feel and move his arms but not move his fingers or lift his arms above his head. He could not move any part of his legs.
5. Rico could not control his bowels or bladder.
6. Rico would probably be able to use a manual wheelchair once he became stronger.

Morgan's Story - SCI Case Study



Here's What Happened

Morgan was a cheerleader in 10th grade who was very pretty and loved fashion. She was very social and considered one of the nicest people at school. Just like every other morning, Morgan was heading to school in the SUV her parents had helped her buy just three months ago. She was still in her quiet neighborhood, where there was virtually no traffic at this early hour. Morgan was in the habit of buckling her seat belt just before she left the residential streets, to pull onto the four lane road outside her neighborhood.

It was Friday, and Morgan and her friends had plans to attend the football game after school. They had discussed at length what they would wear, and Morgan was delighted that it was finally cold enough for her to wear her new boots! She remembered that they had not yet figured out where they would meet up immediately after school ... It was a tradition with her circle of friends that they grab a bite to eat at a local fast food restaurant before the game. She would see her friends once she arrived at school but was excited and wanted to make the plans. This was the perfect time to send off a quick text to her friends to nail down a place to meet. Morgan's parents, her driver's education instructor, the local billboards, and television commercials had all warned her about the dangers of texting and driving, but Morgan knew she was an amazingly fast texter. She smiled as she thought about how painfully slow her mother was at this mindless task! As she approached the intersection, a lawn maintenance truck pulling a trailer overloaded with mowers and leaf blowers, came careening around the corner, wandering over into her lane. But Morgan was looking at her phone, so she did not see what was coming toward her. The vehicles collided. Although she was not going that fast, the sudden impact made her SUV swerve and roll over. Morgan was thrown from her vehicle. The lawn maintenance truck was damaged, and the workers, who had been belted in, were shaken up, but not severely injured. As soon as they realized what had happened, they called 911, and went to help Morgan as best they could. Morgan was breathing, but dazed and just barely able to speak. Her body lay twisted in an unnatural pose. Even to the medically untrained lawn crew, it seemed obvious that this beautiful young girl's life was to be forever changed.

Morgan's Condition - What The Doctors Found

1. Morgan had a fracture at her T-9 vertebrae and had significant swelling of her spinal cord. She required surgery on her spine to stabilize her from T7 to T12.
2. Morgan was able to breathe on her own.
3. Morgan could not feel or move anything below her belly button (the location of T9).
4. Morgan could not control her bowels or bladder.

Levi's Story - SCI Case Study



Here's What Happened

It was the last weekend of summer vacation and, as was tradition, Levi and his friends were going to the lake to do some boating, rope swinging, and dock diving. Levi and his friends got to the lake around 3:00pm on Friday afternoon so that they would have enough daylight to take the boat out for a spin around the lake before setting up the campsite. Of course stories of the past school year and dreams of the next would be shared between this close knit group of friends. Levi and his friends had known each other since 5th grade, and now it was their senior year of high school. They had to make every moment count.

After the friends arrived at the lake and got the boat out on the water they were off. The boat belonged to one of Levi's best friends, Jeff (actually, Jeff's Dad). And Jeff's Dad had it outfitted for fun. There was a built-in stereo system, a shade cover, a depth finder for when they went fishing in the morning, and best of all, a slide that came off of the back of the boat.

The boys cruised around the lake until they found the small cove where they had often dropped anchor many summers before. It was the perfect scene; a warm sunny day, surrounded by friends and full access to the lake. Once the anchor dropped the friends each took turns using the slide, jumping off the back of the boat, and making wise cracks about each other and about girlfriends. As Levi was getting up on the platform to slide for the tenth time, he had the idea to go down head first instead of feet first. When he did, his life was forever changed. As the friends watched Levi go down the slide head first they laughed and cheered. But when, after what seemed like forever, Levi did not come up, and the friends panicked. Then they saw Levi's limp body under the surface of the water. Jeff jumped in to help Levi out of the water and the other friends quickly followed. It took three of them to pull Levi's lifeless body up out of the water and onto the boat. Levi was not breathing and he was unconscious. Jeff jumped behind the wheel of the boat and sped to the dock where he knew his Dad should be arriving with the rest of the camping gear.

As Jeff haphazardly docked the boat the friends yelled frantically to Jeff's Dad who was unpacking on the shore. He came running down to the boat and immediately began CPR. One of the friends called 911 and soon an ambulance arrived to take Levi to the hospital.

Levi's Condition - What The Doctors Found

1. Levi had fractured his C-2 vertebrae and had significant damage to his spinal cord at that location.
2. Levi was unable to breathe on his own so a machine called a ventilator had to help him breathe.
3. Levi was unable to feel any part of body except for the center of his face.
4. Levi could not move any parts of his body.
5. Levi could not control his bowels or bladder.

Jared's Story - SCI Case Study



Here's What Happened

Jared was a sophomore in high school who played basketball and was on the student council. He had dark brown hair and lots of girls always seemed to want to talk to him. It was the first night of Spring Break and Jared planned to go to the movies with two buddies. They were meeting a group of girls from school and he'd been looking forward to it all week. Just as he finished getting dressed in his room, he heard his friend Ryan's car pull up in the driveway. He grabbed his wallet, said goodbye to his mom and headed down the driveway. Ryan was in the driver's seat and their friend Shawn was in the passenger side. Jared slid into the backseat and Ryan wheeled the car back onto the road.

For a split second Jared thought about putting his seatbelt on, but he liked leaning up in the middle between the two front seats so he felt like part of the conversation. He left his seatbelt off. The boys talked about the girls they were meeting and the movie they were going to see. They were laughing and joking, happy to be together and have a break from school. About a mile from Jared's house, they pulled onto a bigger road and Ryan picked up speed.

He came toward an intersection where the light was green. No reason for him to slow down so he kept moving, driving just at the speed limit. But a driver coming from the left wasn't paying attention and ran the red light. The car smashed into the driver's side sending Ryan's car up on the right median where it flipped over and came to rest upside down. Ryan and Shawn were buckled in and did not seem to be hurt badly. Jared was awake, but he was crying and said he couldn't feel his legs.

Someone must have seen the accident and called 911 because the sirens started almost immediately. An ambulance and several police cars pulled up. Ryan and Shawn were stunned, but with the help of some EMTs they got out of the car and sat on the ground while their vital signs were checked. They were yelling to the rescue workers to please help Jared.

The driver of the other car was a girl in her twenties who they didn't recognize. She sat by herself on the side of the road with her heads in her hands, crying.

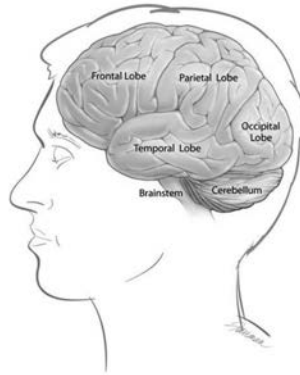
Slowly and carefully the EMTs were able to get Jared out of the car and onto a gurney. They were very careful to keep him stable. He was driven to the hospital immediately. When his parents arrived they were told that Jared had been in a car accident and had a spinal cord injury.

Jared's Condition - What The Doctors Found

1. X-rays showed a burst fracture at L3. This fracture forced bone fragments into Jared's spine causing significant damage.
2. The very night he was injured, Jared had an operation called a spinal fusion to repair damage from L2 to L4 and stabilize his spine.
3. Jared could NOT feel or move anything below his level of injury (L3).
4. Jared could not control his bowels or bladder.
5. His upper body and trunk were not injured and still functioned normally.
6. Jared was able to breathe on his own.
7. Jared would need to use a manual wheelchair to get around. Doctors explained that he might not walk again but it was too early to tell. He might at some point be strong enough to try to walk with braces.

Task 6. Determining Severity of TBI Injury

A. Location of the injury: Indicate where the patient’s injury is located on the lobes image below by drawing arrows to the site of the injury. Remember more than one lobe may be involved. Then list the injured lobes beside the image:



B. Loss of consciousness: Describe the patient’s loss of consciousness reported from the trauma center.

C. GCS Score: Using the results described in “What the Doctors Found” in the case study, circle the description in each category that matches the patient’s reported condition and then enter the number of that description in the Patient Score column. Then add the numbers to derive the total GCS score.

Glasgow Coma Score (GCS)

Student Task

- D. Level Diagnosis:** To determine the level of brain injury, follow the calculations explained in the chart below. Notice that doctors consider both the patient's Glasgow Coma Score (GCS) and loss of consciousness data (LOC). Using the chart below and your patient's GCS score and LOC time, determine the level of your patient's injury.

GCS and LOC Prediction of Severity

Level of Traumatic Brain Injury = _____

Task 7. Case Study Exhibit

Create a case study exhibit that you will use to present your patient to the class later in the unit. Use colored chart paper to cut out a life-sized body outline which will represent your assigned patient. Give the "patient" appropriate physical details such as hair, eyes, etc. Use available materials and creatively present the following information.

1. Patient's name
2. Brief outline of the injury story
3. Summary of medical condition including level of injury (injuries could be drawn on the "patient")

Note: You will have opportunities to add information to this exhibit later in the unit.

Task 8. "Here's What Happened" - Change The Story

- A. Re-read your patient's injury story. Think about what happened to cause the injury and consider if the injury could have been prevented. If so, how could events be changed so that the injury does not occur. In the space below, rewrite the injury part of the story so that the injury is prevented. Be sure to add any prevention ideas to the class Injury Prevention Chart.

Task 6. Describing the Injury

A. Record the patient’s level of injury in the space below.

B. Review the description of the injury. Does the description of the injury indicate that the damage to the spinal cord is

Complete or Incomplete (circle one)

C. Based upon the patient’s level of injury, is this patient’s condition classified as

Paraplegia or Tetraplegia/Quadraplegia (circle one)

D. Record the patient’s ASIA Scale Score? _____ . Explain what this score means:

E. Write a brief description (in complete sentences) of the patient’s spinal cord injury using the correct terminology. Look at the examples on page 26 of the “Introduction to Spinal Cord Injury” under “Describing a Spinal Cord Injury.”

Write as if you are the doctor explaining the patient’s condition to the family. Be sure your description includes

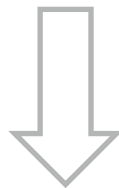
- Level of the injury (location on the spinal cord)
- The amount of damage to the spinal cord
- Extent of paralysis
- ASIA Scale Score

Directions: Consider all the decisions that were made along the path from injury to Trauma Center. Select the three important decisions made during the story either by the patient or someone else. Write one decision in each of the three shapes below.

For each decision, choose one question and write a response. You can choose a different question for each decision or respond to the same question for each.

1. Why was this decision important? Explain.
2. What were the immediate and long-term consequences resulting from this decision?
3. Would you have made a different decision? Explain.

Decision 1 =



Decision 2 =



Decision 3 =



Treating SCI and TBI - The Rehabilitation Team and Medical Careers



What You Will Do

- Learn about medical professionals involved in providing TBI and SCI rehabilitation.
- Recognize the career opportunities that exist in TBI and SCI rehabilitation.

Why It's Important

- Many medical professionals contribute to the well-being of patients in rehabilitation.
- These careers make good choices for students who find them interesting.



Meet Some of the Rehabilitation Team

Each patient will have a team of professionals helping them through rehabilitation. Some of these professions are outlined here, although these are not all of the professionals who might work with rehab patients. Each team member plays an important role in helping the patient reach their maximum recovery potential.



Doctor:

- Typically a rehab specialist called a physiatrist
- Manages all medical care for the patient
- Prescribes medicines
- Watches out for complications such as blood clots, skin sores, and spasms.
- Makes sure the patient is medically stable and able to participate fully in therapy
- Writes prescriptions for equipment, such as wheelchair

Case Manager

- Plans discharge home from the rehab hospital
- Updates patient and family on insurance coverage, insurance approvals and how to best use insurance
- Makes sure the patient's family caregiver is scheduled for training with all necessary team members (PT, OT, TR, SLP)
- Identifies community resources and care providers the patient will need once they are at home
- Coordinates the case with the entire team
- Acts as the point person for the patient and family



Neuropsychologist

- Helps patient understand daily effects of injury
- Helps patient with the physical, emotional, and thinking abilities resulting from the injury
- Performs in-depth cognitive assessments to determine patient's readiness to return to work or school
- Educates families on symptoms of TBI and how to work with their injured family member
- Assists the rehab team with managing TBI symptoms



Counselor

- Talks with patient about emotional responses to injury
- Conducts group therapy sessions to share cognitive and emotional challenges
- Assists family members with emotional adjustment to patient's injury and the life changes that result from it

Nurse

- Manages the physical care of the patients and trains patient and/or family on all personal patient care such as bathing, dressing, bowel & bladder, turns at night, colostomy, and simple wound care
- Manages medications
- Assists with meals/feeding
- Performs head-toe physical exam (check for skin issues, etc.)
- Performs neurological assessment to check for cognitive functional changes (typically mid-day when patient most alert)



Dietician

- Evaluates nutritional status
- Makes recommendations about proper nutrition and diet. Patients are frequently malnourished and underweight after being in the trauma center. Individualized attention to diet and caloric intake assists in recovery.
- Educates regarding menu selection, proper food consistencies, diet changes, etc., as it fits patient needs
- Teaches the patient and their family members how to make healthy food choices that aid in their recovery.
- Works with the Speech Pathologists to help the patient move from depending on tube feeding for their nutrition to eating on their own

Occupational Therapist

- Self-care: showering safely, getting dressed, using the bathroom by yourself, learning to get dressed while seated in a wheelchair
- Arms & hands: tying shoes, buttons, zippers, reaching into the closet, writing, learning to do things using only 1 hand
- Teaches using bathroom, getting into shower, brushing teeth, etc.
- Teaches dressing skills
- Vision: eye exercises for double vision, scanning left and right
- Household chores: unloading the dishwasher, safe cooking, vacuuming, learning to do these while seated in a wheelchair





Physical Therapist

- Works on upper or lower body strength and coordination needed to propel into/out of a wheelchair
- Bed mobility (rolling, getting up from lying down)
- Transfers to all surfaces
- Teaches how to drive or push a wheelchair
- Identifies what type of equipment the patient will need once they are home, writes prescriptions for it and works with the patient's vendor to get the equipment to the patient.
- Teaches patient to walk if they are able to
- Helps someone be able to stand up from various surfaces including getting up from the floor and in and out of a car (transfers)
- Balance activities and endurance/fitness training

Recreational Therapist

- Develops community reintegration skills by taking field trips to restaurants, stores, movies, bowling
- Teaches adaptive sports skills like kayaking, water skiing, rugby, basketball, swimming and any other sports or activities you can think of
- Teaches use of adaptive tools for hunting, gardening, and fishing
- Helps patient to get comfortable going back out in the community in a wheelchair
- Helps the patient with any day to day leisure activities like reading, using cell phones/iPads, Facebook/social media, video games, painting, pottery, etc.
- Teaches how to push/drive a wheelchair over uneven surfaces
- Teaches how to transfer out of a wheelchair chair to sit in a booth at restaurants, an airplane seat, etc.
- Teaches about advocacy/ADA and laws for people with disabilities Teaches patients how to advocate for themselves and their needs in the community. Ex: doorways being wide enough, raising tables to fit wheelchairs under them



Speech Therapist

- Sits with patients for breakfast/lunch: Patients often need help staying focused due to deficits in attention and may have to re-learn to swallow after a brain injury. Some patients need to start with very soft food (ex. pudding) because they have weak swallowing muscles and cannot tolerate a regular diet.
- Reviews daily schedule with patients
- Teaches strategies for organizing daily living activities
- Helps people talk when they use a ventilator to breathe
- Works with patient to determine when they are ready to go back to school or work
- Helps patient sequence steps of activities such as taking a shower. Helps patient identify and be able to list the things they need (shampoo, soap, etc) in order in which they use them. Provides guidance to patients who typically lack initiative complete these basic tasks
- Writes out daily schedule: Reviews the day of the week, date, month, and year as well as where the patient is and why they are here. Due to deficits in short-term memory, patients often are unaware of where they are, what the year is, or why they are in the hospital

Task 9: Rehabilitation Medical Careers - This Could Be You!

You have met the team that provides care to patients during rehabilitation. Each has a specific role and makes a unique contribution to the patient's well-being.

Directions: Review your notes from the video and the “Meet Some of the Rehabilitation Team” resource. Select the profession that you find most interesting and complete the following activities.

- Career Profile:** Write a profile of the career you have selected. This profile should be written in paragraph format. Use the following format as a guide to organize your profile.
 - Create an interesting title.
 - Begin the profile with a topic sentence that names the selected career.
 - Summarize the main activities associated with this career in several sentences and describe what you like about each activity.
 - Explain the education required to enter this career (explained in the video).
 - Close by recommending this career to others and tell why you make this recommendation.
- Interview Questions:** If you could interview the professional you selected, what questions would you ask? Create a list of 5 interview questions that will help you get more information about the career that interests you.
- Career Symbol:** Think about the symbols associated with well-known brands. Create a symbol that you think represents your selected career. Try to make the symbol convey some aspect of the career that will appeal to others. Consider the examples below to give you some ideas.





LESSON

6

The Rehabilitation Experience



What You Will Do

- Recognize the many activities that fill patients' days during the rehabilitation process.
- Understand the value of each activity as patients prepare to return to daily living.
- Recognize the career opportunities that exist in TBI and SCI rehabilitation.

Why It's Important

- Patients in rehabilitation must learn how to manage daily life after their injuries.
- Many professionals contribute to the rehabilitation experience.
- Activities that uninjured people take for granted can be very challenging for someone with SCI or TBI.





Directions: Read the following descriptions of life in rehab. Predict which statements are True and which are False by marking your choices in the column labeled “Before.” You will review your answers later in the lesson.

Before		Descriptions of Life In Rehab after Traumatic Injury	After	
True	False		True	False
		Rehabilitation from traumatic injury is usually over in a few days.		
		A team of rehab professionals works with every SCI and TBI patient.		
		Patients in rehab never have opportunities to play games and sports.		
		During rehab, patients follow a daily schedule.		
		Rehabilitation focuses only on the patient’s physical condition.		
		In rehabilitation, the patients spend most time being treated by doctors.		
		The patient’s medical condition determines rehabilitation activities.		
		Once patients leave rehab, they no longer need medical care.		
		Patient’s families are not involved in the rehabilitation experience.		
		In every age group, there is a higher likelihood of a male suffering from a traumatic injury than a female.		

A Letter from Caylee's Mom



Hello to all of you from Caylee. I told her I was writing a letter to all her friends and she smiled. Caylee has come a long way since her accident, but she still has very far to go. Her room here at the hospital is decorated with cards from everyone and she has the huge made by other classmates over her bed. Every night she sleeps with the big pink bear her best friend Brittany sent.

As some of you may know, as a result of being hit by the car, Caylee has a brain injury. It's classified as a moderate injury, which means it's very serious but it could be worse. When she was first injured she was taken to a trauma center where she had surgery. Once she was stable, we moved to a rehab hospital that specializes in brain injuries. The goal here is to help her relearn as much as she can and to make sure we can take care of her and keep her safe.

One of the toughest things is that Caylee sometimes doesn't recognize us. She seems to always know her brother, but it's hit or miss with her dad and me. I have to remind her that I'm her mom and I love her.

She's not able to do things that were once very easy for her. We have to tell her to use the bathroom and show her what to do. Every time. She's physically able to walk, but doesn't know where she's going. If she were to be lost she wouldn't even know how to ask for help. Because of this the unit she's on in the hospital has locked doors. It's not safe for brain injured patients to be able to walk around by themselves. She's also physically able to eat, but has to have help at every meal to remember the steps to feed herself and how to chew and swallow her food. Her team of therapists are teaching her the steps of all these every day activities like brushing her teeth, eating, grooming, getting dressed and going to the bathroom.

Sometimes Caylee's behavior is challenging. She has outbursts and yells things from out of nowhere. She's easily frustrated and agitated. We're told this is all very common for someone with her injury. She has a communication problem called aphasia, which means she has a hard time understanding what people are saying to her and processing information. She has a hard time remembering what words to use to communicate. Her speech therapist helps her with these issues, but recovery is slow and may take years.

We have to childproof our home just as though we were bringing home a toddler. We have to learn ways to keep Caylee safe so she won't hurt herself. At first she will need someone with her all the time. The doctors hope that in a few months, if she continues to improve, she won't need someone 24 hours a day. But all brain injuries are different, so we just have to wait and see. If she's able to come back to school, she will probably not be in the same classes and she'll need a lot of extra help.

Since I have all of your attention, I just want to say that I hope each and every one of you learns from what happened to Caylee. She knew that she was supposed to wear a helmet, but she didn't do it and now our lives are very different and will be forever. Please be safe when you're out there. Wear a helmet. Wear a seatbelt. Be careful. You don't have to be going far from home to get hurt. This happened on a quiet street right by our house and the car that hit her was not going very fast at all. Please be safe.

That's all for now. We're taking it day by day and are thrilled by every single improvement.

Linda, Caylee's Mom

A Letter from Trey's Mom



Hi kids,

I know you're all wondering how Trey is doing. I thought it would be best if you heard the update from me. His brain injury is severe. He was in a coma for 25 days and since he's come out of the coma, he's still not the person you remember at all. He can't talk or breathe on his own. He will open his eyes if someone pricks him with a pin, but otherwise he doesn't open them. And if he does open them he doesn't really see us. I'm spending my days here at the rehab hospital learning how to take care of Trey, which is very hard work. He can't move himself to do anything, so I have to bathe him, dress him and turn him often so he won't develop skin sores. He is not aware when he needs to urinate or have a bowel movement, so he wears diapers. I change him just like I did when he was a baby. He is on a machine called a ventilator that breathes for him. He can't eat food or drink. He's fed and given water and his medications through a tube in his stomach. He's lost a lot of weight. The therapists are teaching me how to keep his limbs stretched out so they won't get stuck – a condition called contractures.

I know you're all wondering if Trey will ever be back to the person you knew. It's hard to say what the future holds, but as of now it's looking like he's going to stay the way he is. After rehab we'll take him home. His room will look more like a hospital room than a teenager's bedroom. Someone will have to be with him all the time. My job provides our insurance benefits so I'll have to hire caregivers for him while I'm at work. My hope is that all of you will learn from what happened to my son. I hope you'll think carefully before you do things that could be dangerous. Trey was a great kid and never in trouble. He didn't mean for this to happen, I'm sure. But if he'd thought it through before he pulled that stunt, he might be back at school with you guys. I wish he could be.

From Carolyn, Trey's mom

A Letter from Maya's Dad



Hi Everyone,

I think you guys all know what happened to Maya since it was all over the news. She was walking in a crosswalk on a green light and was hit by a driver who was trying to make it through before the light turned red. She has a few fractures and some scrapes, but the real problem is that she has a serious brain injury. It's called a closed-head injury meaning that all the damage happened on the inside from her brain hitting against her skull. This kind of injury can be just as bad as an open wound. We're learning a lot of things like this that we never knew before.

Maya's recovery has been slow. She can follow some commands but slowly and with a lot of effort. She can say a few words, but clearly has a very hard time expressing a whole thought and understanding what others say to her. We have to repeat things a lot and have to be very patient with her with every activity. We're expecting to be here for at least another month and then we're hoping she can do a brain injury day program where she'll have therapy all day long for several months.

Maya has been able to stand up, but she has to lean on a walker and it takes a lot of energy just to get up. She might be able to walk on her own again one day, but we know it will be a long time from now and it might always be challenging. We're going to have to be with her all the time once we leave and will have to help her do just about everything – bathe, get dressed, eat meals, and go to the bathroom. Nothing will be quite like it was before.

My hope is that Maya can come back to school with you in the next year. I'm hoping you all will come visit her at home before then so you can get comfortable with the fact that she's not the way you remember her. She's very different in many ways. Sometimes she's not sure who her loved ones are and sometimes she laughs or cries for no apparent reason. She has a very tough time remembering things, but does remember some important things from her life before. When she was finally conscious and able to communicate, she told her doctor that she wanted to be a doctor. We love her as much as we always have and we hope that you will too.

Apparently the driver who hit Maya was speeding and Maya wasn't looking. If either one of them had been paying better attention this might not have happened. All I can say is that I hope you learn something from what happened to my beautiful girl. She may not ever be a doctor like she planned, but maybe she can still save some lives by telling her story. Please share this letter with anyone at school that's wondering about Maya. I know she wants you all to know about the progress she's made since she came to rehab and how you can avoid ending up in a tough situation like this.

*Love,
Joseph, Maya's Dad*

A Letter from Kendrick



To all my friends,

I miss you all! Thank you for keeping in touch. I don't think I could have made it this far without the encouragement. It means everything. The walls in my hospital room are covered with cards and posters and pictures. It makes it feel like it's my room and not a hospital.

Anyway, I wanted to tell you guys about what happened and how I'm doing. Going through this is like nothing you can imagine. It's the hardest thing I've ever done. When I first got hurt I had no idea what had really happened to me. I didn't understand what it meant. It means the rest of my life will be really different. I'm paralyzed from the shoulders down. I always thought being paralyzed just meant you couldn't walk, but it means a heck of a lot more than that.

When I first got here I couldn't breathe on my own and had to be on a ventilator. The doctors told us that you never know how much better someone will get, but they figured since I was young and healthy and my diaphragm muscle was working that I would be able to come off the ventilator. I finally got off of it a couple weeks ago. It took a really long time though and was like having to work out all the time. I had to practice breathing and I came off the vent for a little bit more time every day. There was a girl down the hall who got hurt in a gymnastics accident and she was on a vent too. We decided to have a contest to see who could get off it first, which helped with motivation when I didn't feel like trying anymore. She won :)

Now I'm learning how to do what I can and my rehab team is teaching my mom how to take care of me. She's been with me every single day since we got here. She sleeps in my room on an air mattress since we're 400 miles from home and can't really spend the money for a hotel. I'm glad though. I'd rather have her here with me anyway. The nurses are really nice, but it's much easier to ask my own mom to scratch my nose or get me some water.

It's been a few months since I got hurt and it seems like I'll be using a power wheelchair for the long haul. Some people get movement and feeling back as time goes on, but I haven't. I have a complete injury and nothing about what I can feel or move has changed. At this point I'm just really happy I can breathe on my own and don't need a feeding tube anymore. After I came off the vent, I was able to eat a lot more easily. I still had to have a trach, which is a hole in my throat, for a few weeks, but that's gone now too and there's just a little scar there.

I'll be home in a few weeks. I'll still need some therapy, but I'm hoping I can still start college next fall like I planned. It won't be the same, but I think it'll mean more to me now than ever.

Keep praying for me,
Kendrick

A Letter from Rico



Hey guys,

Well by now I guess you heard what happened to me. I think the whole school knows about it, if not the whole town. I was hurt in a wrestling match. My opponent used a move that he shouldn't have and it ended with me having a broken vertebrae and a spinal cord injury. Man, I didn't know anything about these injuries before I got hurt. Let me tell you – it changes EVERYTHING!

I had to have surgery to stabilize my spine in the trauma center. About a week after that I was sent to the rehab hospital to start learning how to do things for myself again. The first thing I had to do in rehab was take an exam, but nothing like what we have in school. This one is called an ASIA exam and it's to find out what parts of my body can move and feel normally or are impaired. A therapist stuck pins in my skin and then touched my skin with cotton balls to see exactly where I had feeling. This was done from my face to my toes.

The places above where I got hurt are pretty much the same as before. I can breathe and move my head, neck and shoulders just fine. My biceps (the big arm muscles on top) are strong and I can use my wrists and triceps (the smaller arm muscles on the underside). I can't move all my fingers. I have no use of my abdominal muscles so sitting up in my wheelchair is difficult because I can't hold my back up. There is a strap that helps me to sit up.

Going to the bathroom is the worst part cause I can't really do it anymore. But my body still has to empty out, so I have to use catheters to empty my bladder. I have a bowel program every night to empty my bowels. The nurses do that for me, but I'm going to learn how to do it next week. My occupational therapist said it will be hard for me because I have short arms, so she's going to have to make me a tool to help me reach. It's crazy. Like I said, stuff I just never imagined before.

I'm using a manual wheelchair to get around. It's really hard because I'm so weak. And I have to totally rely on my arms and shoulders to push since I have no use of my trunk muscles. My shoulders are sore all the time! I have to take pain meds for it. My physical therapist said it'll get better as I get stronger, but it might take a while and I'll always have to be careful with my shoulders.

Going from one thing to another (bed to wheelchair/wheelchair to bed) is called a transfer. That's a big part of what I'm doing in physical therapy (PT). I'm learning how to transfer with something called a slide board. It's just what it sounds like – a board that I slide on to move from one thing to another. It's a little scary and takes a lot of energy. But my PT is there to help me if I start to fall. And sometimes I just fall. If that happens the PT helps me get up and we do it again till I get it right.

I don't know what I could have done to prevent what happened to me, but I know the other guy could have if he'd only used the correct moves. What happened to me shows that we have rules in sports for a reason, so no one gets hurt. I know that guy feels awful. I'm not ready to talk to him about it, but I know he'd want to spread the message that you have to be careful in sports. Listen to your coaches!

I think that's enough for now. Time for another therapy session!

Rico

A Letter from Morgan



Hi Everyone,

I really miss everyone and I can't wait to come back to school. I don't know how much you know, but I have a spinal cord injury. It's a complete injury at T9, which means I can't walk and I don't think I will ever be able to. I can't feel or move anything below my belly button. I'm still sad about the accident and I'm working with my counselor few times a week to figure out how to deal with it. It's not easy, but I'll get through it.

Some of the hardest parts are things you would never have thought about! I used to think being paralyzed just meant you couldn't walk, but it means so much more than that. I have to relearn EVERYTHING! Getting dressed, getting out of bed, taking a shower. My arms and hands work just fine so I can push a manual wheelchair, but it's really, really hard. I have to build up a lot of upper body strength and I have to learn from my physical therapist how to move around in the chair. It's not as easy as it looks! So far I've just been pushing around the hospital floor and through the gym. Soon I'll have to learn to go up ramps and hills and do wheelies - that's the advanced stuff. I always thought if you pushed someone in a wheelchair you were doing them a favor, but I'm learning that it's best to push myself as much as possible to build up strength. I try not to let my mom push me when we're going to the cafeteria and things like that. But I do have to be careful to make sure I don't injure my shoulders by working them too hard. It's a lot to think about.

The worst, very worst part is that I can't go to the bathroom the way I used to anymore. I have to use catheters, which are tubes that drain my bladder. I have to put one in every 4 hours. It doesn't stay in or anything. You just drain it and then take the tube out. My occupational therapist is teaching me how to do it by myself. My mom had to learn how to cath me in case I ever can't do it. Talk about embarrassing! But when you go through this you get used to this stuff pretty quickly. To go number two have to do a bowel program. I can't do it myself yet, but I'm hoping to learn so I won't have to have help later.

I keep thinking back about the accident and how one bad decision changed my life forever. For a stupid text message! It could have waited. Or I could have pulled over. I just can't believe such a small thing can cause so much damage for me and my whole family. Now I see how dangerous it is to drive distracted. Please, please, please keep your eyes on the road when you're driving and make sure the people around you do too! You don't have to be the one making the mistake to get hurt. I never want this to happen to any of you.

The good news about my injury is that the doctor says even if I never get any more movement back I can still live alone someday. I can still drive, go to college, have a job, have a baby and lots of things that I wasn't sure I'd still be able to do. I just might have to do them a little differently than someone who doesn't have my injury. I guess that's it for now. Keep me in your thoughts and I hope to see you all soon!

Morgan

A Letter from Levi



Hi Guys,

I know you probably weren't expecting to hear from me since my accident was so bad, but my therapists thought it would be a good thing for me to write you a letter and tell you how I'm doing. I'm using a new computer program called Dragon that types what I'm saying so I'm practicing with it. So here's the deal: I have a spinal cord injury from breaking my neck when I went down the slide head-first into the lake. I hit the bottom really hard and broke my neck at C2, which is a really bad injury. It means that I can't feel or move anything other than my head and I can't breathe on my own. I have to stay on a machine called a ventilator all the time. There's a hole in my throat called a tracheostomy where the ventilator tube attaches.

I can't really do much for myself. The nurses are teaching my parents how to take care of me. They're learning to get me out of bed with a thing called a hooyer lift. They're learning how to dress me, bathe me, empty my bladder with a tube, clean out my bowels with a suppository, feed me and anything else you can think of. There are some things I can do, although I still need some help. I can drive my power wheelchair with a tube that goes to my mouth called a sip-and-puff. If I blow or suck through the tube it tells the wheelchair which direction to go. I can move forward, backward, in a circle or whatever. But I can't be alone for a lot of reasons. I can't open doors or push elevator buttons. I can't cough, so if I get something in my throat (which happens a lot) someone has to push on my chest to make me cough. I can eat regular food, but someone has to feed me. And even though I can't really feel or move most of my body I have a lot of pain that I have to take medicine for. It's called nerve pain. It's kind of like when your foot falls asleep. The medicine helps, but the pain is always there. I also have had some urinary tract infections, which can make me have fevers and headaches. Then I have to take antibiotics, which make me feel a little sick to my stomach. Every day there's some new thing to deal with, but I'm getting more used to it. Not sure if I'll ever really be used to it.

My parents are getting the house ready for me. They hired a contractor to build a ramp and big shower that I can roll into on my giant shower chair. It's like a wheelchair, but it's made for getting wet. They have to widen some doors at home too so my wheelchair will fit. My mom used to have a job, but she quit because someone has to be with me all the time and it's cheaper for her to do it than for us to pay for a nurse. Insurance doesn't pay for someone to help me. Anyway, I know that's a lot and doesn't sound so positive. I'm trying to keep a good attitude and I'm making it my goal to go to college as soon as I can. I may not have control over my body, but I do of my brain and I always did well in school. I met a man with an injury just like mine and he's an engineer for a big corporation. He has to have someone help him at work, but he still has a good career. I know I can do that too if I just put my mind to it.

I wanted to tell you guys to be careful when you're around water this summer. In here I've met 8 other people that were hurt in diving or water accidents. Some in pools, some in lakes, like me, and some in the ocean. I never knew this could happen. Think before you go head first into anything you guys! It's not worth it. My life will be different, in a really hard way, forever.

Anyway, keep the cards and emails coming. It means a lot to know you're out there and still thinking about me. I'll be home in a few months and hopefully we can have a big party then!

Levi

A Letter from Jared



Hi Y'all,

It's your old friend Jared. Where to start? It's been a crazy ride since I saw you last. I was in the back seat of my friend Ryan's car and we got into a wreck. I didn't have my seatbelt on and I got hurt. Bad. I ended up breaking a bone in my lower back (L3) and as a result I have a spinal cord injury. I'm so mad at myself for not wearing my seatbelt. If I had, maybe, just maybe this wouldn't have happened. Best I can do now is move forward and tell you guys about what happened so it never happens to any of you.

When I first got hurt I was really freaked out. You can't imagine what it feels like to not feel your legs. It was so scary and I'm not ashamed to say I was crying my head off. The ambulance came and the paramedics had to get me out of the car. Once I got to the hospital my parents showed up and were both a mess. But they were happy I was alive and that it wasn't worse. I had to have surgery almost right away to stabilize my spine. Then I had to wait till they would let me leave for rehab.

As bad as my injury is, I'm lucky it wasn't higher. I can still breathe and should be able to do pretty much everything for myself. I have full use of my upper body including my hands and all my fingers. My core muscles are still strong, so I can hold myself up and use a lot of that strength for transferring from one thing to another (like my bed to my wheelchair). I can't walk because my leg muscles don't work, but soon I'm going to try to walk using braces and a walker. But the thing is it's really slow and very tiring so I will probably just use a wheelchair most of the time. I can get around a lot faster in the chair. I have to use catheters to empty my bladder every four hours. It's not fun and means I have to wake up to do it once at night. I have to use a bench in the tub to bathe since I can't stand and I have to use a handheld shower head. A lot of things are different. I'll still be able to work and drive and can actually still have kids if I want to, but I'd have to have help from a doctor to make it happen.

I can communicate same as always. My brain isn't injured, just my body. But I'm sad a lot. I'm worried about what the future will be like and I hope that they'll come up with a way to cure SCI in the near future. Please guys, wear your seatbelt. It might not seem cool or whatever, but trust me, there is nothing cool about getting hurt, having to be in a hospital for weeks and not being able to go to the bathroom on my own anymore. It's really tough. I don't ever want anyone else to have to go through this. Miss you guys.

Jared

Task 10: The Rehabilitation Experience

Student Task

Directions: View the “Fighters” video and with the help of your teacher complete the chart below.

WHAT YOU SEE PATIENTS DOING	WHAT YOU MAY NOT REALIZE
1. Using an IPAD	
2. Using red boxing gloves	
3. Singing in power wheelchair with iPad	
4. “Chorus line” of therapists	
5. Using an electrical stimulation arm exerciser	

Task 10: The Rehabilitation Experience continued

Student Task

Directions: View the “Fighters” video and with the help of your teacher complete the chart below.

WHAT YOU SEE PATIENTS DOING	WHAT YOU MAY NOT REALIZE
6. Balancing with arms on therapy mat	
7. “Walking” suspended from ceiling on ZeroG Dynamic walking machine (G stands for “gravity”)	
8. Putting on contacts	
9. Going downstairs in a wheelchair backwards	
10. Therapist on mat with patient. Both laying on backs	

Task 10: The Rehabilitation Experience continued

Student Task

Directions: View the “Fighters” video and with the help of your teacher complete the chart below.

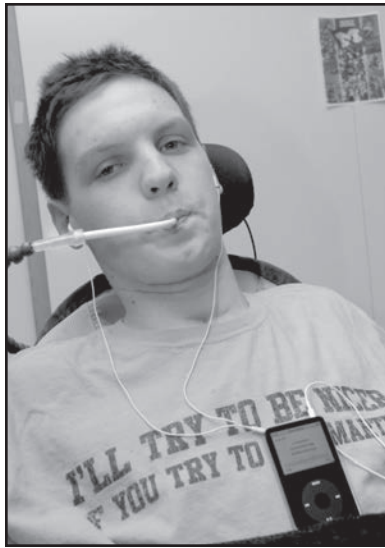
WHAT YOU SEE PATIENTS DOING	WHAT YOU MAY NOT REALIZE
11. Singing in power wheelchair	
12. Two patients singing in their wheelchairs	
13. Parade of wheelchair patients in blue carpet hallway	
14. Moving from floor to wheelchair	
15. Doing circles in wheelchair	

Task 10: The Rehabilitation Experience continued

Student Task

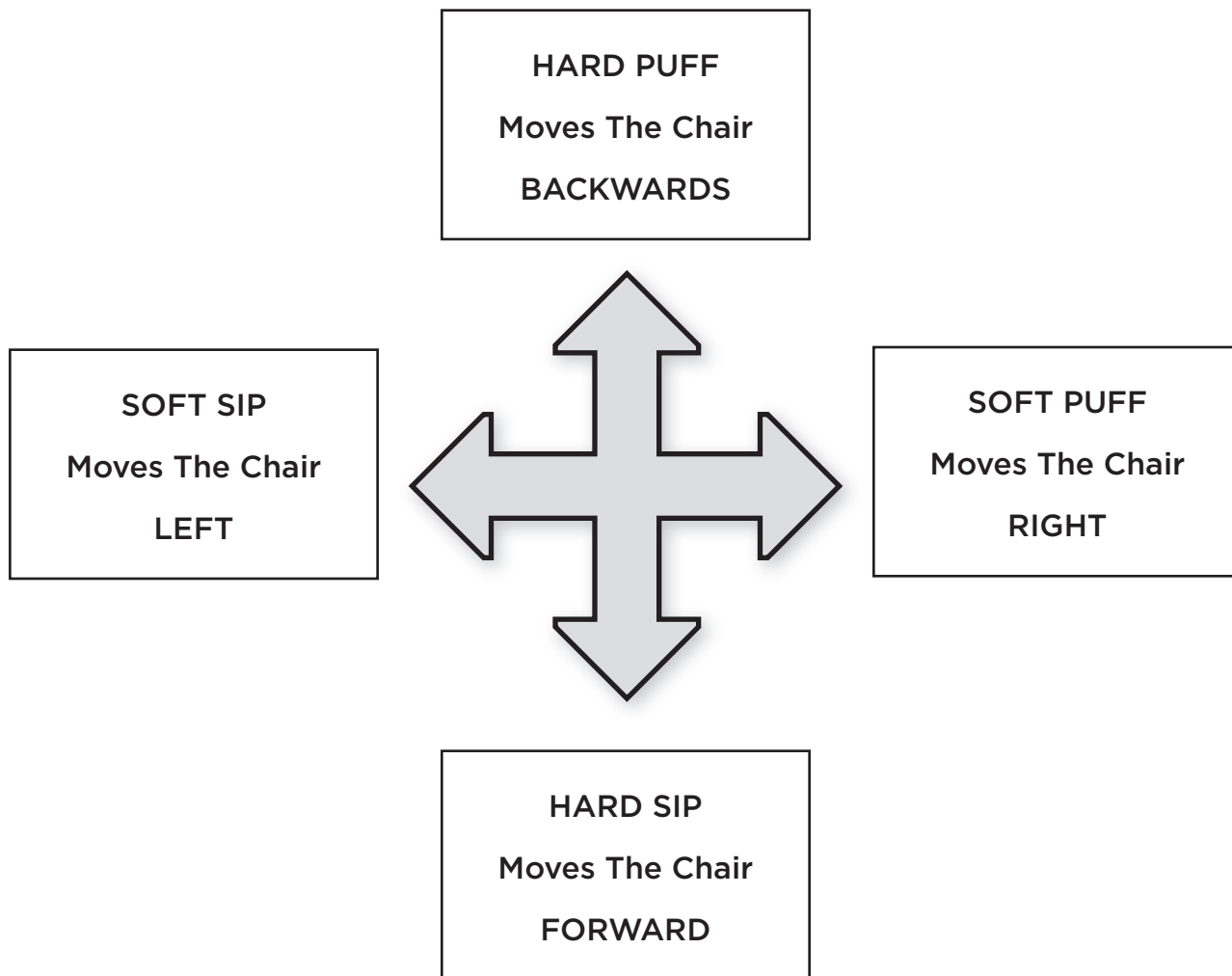
Directions: View the “Fighters” video and with the help of your teacher complete the chart below.

WHAT YOU SEE PATIENTS DOING	WHAT YOU MAY NOT REALIZE
16. Patient and counselor walking down hallway	
17. Two patients - one throwing food into the mouth of the other	
18. Putting on makeup	
19. Doing wheelies	
20. The Real Deal	<p>REMEMBER - JUST A FEW WEEKS PRIOR TO THIS VIDEO, THESE YOUNG PEOPLE WERE UP, WALKING AROUND AND HAD NO IDEA THIS WAS GOING TO HAPPEN TO THEM. MAYBE SOME OF THEIR ACCIDENTS COULD HAVE BEEN PREVENTED ... IF THEY HAD KNOWN WHAT YOU NOW KNOW!</p>



Persons with high level spinal cord injuries who do not have use of their hands can move their wheelchairs by breathing into a tube that controls the chair's movement. Patients move their chairs in any direction by following a code of breathing in (sipping) or blowing out (puffing). The sequence and intensity of the breathing directs the chair.

Activity: Using a straw with a balloon attached, sip and puff on the straw using the code below. Move your body in the direction that corresponds to the sips and puffs you make.





LESSON

7

Return to Daily Living



What You Will Do

- Recognize the long-term care needs of SCI and TBI patients.
- Calculate the cost of your case study teen's long-term care.
- Finalize your case study exhibit.

Why It's Important

- Traumatic injuries come with significant costs.
- Insurance does not always cover these costs so families must find a way to pay for them.
- The emotional costs for families and patients cannot be measured in dollars.





I always knew my mom loved me but never realized how much until she had to care for me when I returned home from rehab. Here is what she did every day.

She had to give me a bath in bed.

She had to spend 30 minutes dressing me.

She had to brush my teeth and comb my hair.

She had to help me cough by pushing on my abdomen.

She had to prepare every meal and snack I ate.

She had to feed me.

She constantly helped me fight despair and depression.

She had to insert a catheter into my bladder and change the urine bag when needed.

She had to help me with my bowels every day by giving me a suppository and then cleaning me.

She had to wipe away my tears.

She had to help me get into a car.

She had to help me change position every 30 minutes during the day to avoid pressure sores on my bottom.

She had to **get up every two hours** during the night to turn me from side to side and keep pillows between my knees and under my feet to keep the skin from developing sores.

She rejoiced at every improvement in my condition no matter how slight.

She never stopped showing her love for me.

Task 11: Costs of Daily Living with TBI

Student Task

CAYLEE (TBI Moderate)

Typically patients are ready to go home after about two months in rehabilitation. Family and friends must make careful preparations to help the patient with this transition. One of the most critical concerns for daily living is the costs to the families.

Directions: The rehabilitation team has identified the following expenses will be required for your patient. Read through the list carefully looking at the costs of each item. Notice how each cost is reported. Some are one-time costs while some are recurring. Use this information to calculate your patient's expenses for one-year of care on the Task 11 form.

MODERATE TBI LONG-TERM CARE EXPENSES		
ITEM	COST	TOTAL COST PER ITEM
Home Modifications		
1. Grab Bars in Shower	\$100	
2. Hand-Held Shower Spray	\$30	
3. Life-Line Alert System	\$95 contract fee; \$30 monthly service fee	
Equipment		
1. Shower seat	\$60	
2. Bedside commode	\$45	
3. Walker	\$115	
4. Wheelchair rental	\$140/month	
5. Diapers/misc.	\$60/month	
Daily Living Assistance		
1. Medicine	\$180/month	
2. Pill Organizer	\$7	
3. Personal Care Assistant for 3 months - 10 hours per day	\$20/hour	
4. Follow-up therapy	\$400/week	
	Total cost for one year:	

Task 11: Costs of Daily Living with TBI

Student Task

TREY (Severe TBI)

Typically patients are ready to go home after about two months in rehabilitation. Family and friends must make careful preparations to help the patient with this transition. One of the most critical concerns for daily living is the costs to the families.

Directions: The rehabilitation team has identified the following expenses will be required for your patient. Read through the list carefully looking at the costs of each item. Notice how each cost is reported. Some are one-time costs while some are recurring. Use this information to calculate your patient's expenses for one-year of care on the Task 11 form.

SEVERE TBI LONG-TERM CARE EXPENSES		
ITEM	COST	TOTAL COST PER ITEM
Home Modifications		
1. Ramps	\$700	
2. Shower modifications	\$1,900	
3. Hand-held Shower Sprayer	\$30	
4. Doorways	\$2,000	
5. Electrical power supply additions	\$1,200	
6. Back-up generator	\$2,000	
Equipment		
1. Roll-in Shower Chair	\$2,500	
2. Wheelchair, manual	\$2,500	
3. Wheelchair, power - may need for longer distances in the community	\$15,000	
4. Hoyer, manual - a metal lift used to help transfer the person from one surface to another.	\$750	
5. Hospital Bed	\$1,500	
6. Hand Splints	\$400	
7. Leg Splints	\$1,500	
8. Ventilator	\$300/month	
9. Wheelchair accessible vehicle	\$42,000	
Daily Living Assistance		
1. Medicine	\$200/month	
2. Feeding Pump	\$1,000	
3. Tubing bags	\$100/month	
4. Tube Feeding	\$270/month	
5. Blood Pressure Cuff	\$50	
6. Suction machine/supplies	\$650/year	
7. Diapers/ Supplies	\$150/month	
8. Personal Care Assistant - 24 hours every day	\$20/hour	
	Total cost for one year:	

Task 11: Costs of Daily Living with TBI

Student Task

MAYA (TBI Moderate)

Typically patients are ready to go home after about two months in rehabilitation. Family and friends must make careful preparations to help the patient with this transition. One of the most critical concerns for daily living is the costs to the families.

Directions: The rehabilitation team has identified the following expenses will be required for your patient. Read through the list carefully looking at the costs of each item. Notice how each cost is reported. Some are one-time costs while some are recurring. Use this information to calculate your patient’s expenses for one-year of care on the Task 11 form.

MODERATE TBI LONG-TERM CARE EXPENSES		
ITEM	COST	TOTAL COST PER ITEM
Home Modifications		
1. Grab Bars in Shower	\$100	
2. Hand-Held Shower Spray	\$30	
3. Life-Line Alert System	\$95 contract fee \$30 monthly service fee	
Equipment		
1. Shower seat	\$60	
2. Bedside commode	\$45	
3. Walker	\$115	
4. Wheelchair rental	\$140/month	
5. Diapers/misc.	\$60/month	
Daily Living Assistance		
1. Medicine	\$180/month	
2. Pill Organizer	\$7	
3. Personal Care Assistant for 3 months - 10 hours per day	\$20/hour	
4. Follow-up therapy for 4 weeks	\$400/week	
	Total cost for one year:	

KENDRICK (C4 Tetraplegia)

Typically patients are ready to go home after about two months in rehabilitation. Family and friends must make careful preparations to help the patient with this transition. One of the most critical concerns for daily living is the costs to the families.

Directions: The rehabilitation team has identified the following expenses will be required for your patient. Read through the list carefully looking at the costs of each item. Notice how each cost is reported. Some are one-time costs while some are recurring. Use this information to calculate your patient’s expenses for one-year of care on the Task 11 form.

SCI LONG-TERM CARE EXPENSES - C4 Tetraplegia		
ITEM	COST	TOTAL COST PER ITEM
Home Modifications		
1. Ramps	\$700	
2. Roll-in shower	\$1,800	
3. Lower kitchen sink/counters	\$1,000	
4. Widen doorways	\$2,000	
Equipment		
1. Hospital Bed	\$1,000	
2. Wheelchair, back-up manual, in case power chair breaks or person must travel in a car.	\$2,500	
3. Wheelchair, power	\$25,000	
4. Hoyer lift, manual for transfers from one surface to another	\$750	
5. Bathroom equipment - roll-in shower chair: a special wheelchair that can get wet.	\$2,500	
6. Hands free telephone system	\$300	
7. Wheelchair accessible van	\$42,000	
Daily Living Assistance		
1. Medicine	\$200/month	
2. Bowel and bladder supplies	\$500/month	
3. Personal Care Assistant	\$20/hour	
4. Therapy (physical, occupational)	\$400/week	
5. Blood pressure cuff	\$50	
6. Medication organizer box	\$7	
	Total cost for one year:	

RICO (C7 Low Tetraplegia)

Typically patients are ready to go home after about two months in rehabilitation. Family and friends must make careful preparations to help the patient with this transition. One of the most critical concerns for daily living is the costs to the families.

Directions: The rehabilitation team has identified the following expenses will be required for your patient. Read through the list carefully looking at the costs of each item. Notice how each cost is reported. Some are one-time costs while some are recurring. Use this information to calculate your patient’s expenses for one-year of care on the Task 11 form.

SCI LONG-TERM CARE EXPENSES - C7 Low Tetraplegia		
ITEM	COST	
Home Modifications		
1. Ramps	\$700	
2. Roll-in shower	\$1,800	
3. Lower kitchen sink/counters	\$1,000	
4. Widen doorways	\$2,000	
Equipment		
1. Wheelchair, manual	\$2,500	
2. Wheelchair, power - may need for longer distances in the community	\$25,000	
3. Hoyer, manual - a metal lift used to help transfer the person from one surface to another.	\$750	
4. Slide board - wooden board for transfers	\$50	
5. Bathroom equipment - tub bench	\$100	
6. Bathroom equipment - raised toilet seat, goes over the regular toilet seat	\$300	
7. Car, already owned, modified with hand controls	\$16,500	
Daily Living Assistance		
1. Medicine	\$200/month	
2. Bowel and bladder supplies	\$500/month	
3. Therapy (physical, occupational)	\$400/week	
4. Blood pressure cuff	\$50	
5. Medication organizer box	\$7	
	Total cost for one year:	

Task 11: Costs of Daily Living with SCI

Student Task

MORGAN (T9 Paraplegia)

Typically patients are ready to go home after about two months in rehabilitation. Family and friends must make careful preparations to help the patient with this transition. One of the most critical concerns for daily living is the costs to the families.

Directions: The rehabilitation team has identified the following expenses will be required for your patient. Read through the list carefully looking at the costs of each item. Notice how each cost is reported. Some are one-time costs while some are recurring. Use this information to calculate your patient's expenses for one-year of care on the Task 11 form.

SCI LONG-TERM CARE EXPENSES - T9 Paraplegia		
ITEM	COST	TOTAL COST PER ITEM
Home Modifications		
1. Ramps	\$700	
2. Lower kitchen sink/counters	\$1,000	
3. Widen doorways	\$2,000	
Equipment		
1. Wheelchair, manual	\$2,500	
2. Bathroom equipment - tub bench	\$100	
3. Bathroom equipment - padded, raised toilet seat	\$300	
4. Car, new modified with hand controls	\$42,000	
Daily Living Assistance		
1. Medicine	\$180/month	
2. Bowel and bladder supplies	\$500/month	
3. Therapy (physical, occupational)	\$400/week	
4. Blood pressure cuff	\$50	
5. Medication organizer box	\$7	
	Total cost for one year:	

Task 11: Costs of Daily Living with SCI

Student Task

LEVI (C2 Tetraplegia)

Typically patients are ready to go home after about two months in rehabilitation. Family and friends must make careful preparations to help the patient with this transition. One of the most critical concerns for daily living is the costs to the families.

Directions: The rehabilitation team has identified the following expenses will be required for your patient. Read through the list carefully looking at the costs of each item. Notice how each cost is reported. Some are one-time costs while some are recurring. Use this information to calculate your patient's expenses for one-year of care on the Task 11 form.

SCI LONG-TERM CARE EXPENSES - C2 TETRAPLEGIA		
ITEM	COST	TOTAL COST PER ITEM
Home Modifications		
1. Ramps	\$700	
2. Roll in shower	\$1,800	
3. Kitchen sink/counters	\$1,000	
4. Widen doorways	\$2,000	
5. Electrical power supply additions	\$1,200	
6. Back-up generator	\$2,000	
Equipment		
1. Hospital Bed	\$1,000	
2. Wheelchair, back-up manual, in case power chair breaks or person must travel in a car.	\$2,500	
3. Wheelchair, power	\$25,000	
4. Hoyer lift, manual for transfers from one surface to another	\$750	
5. Bathroom equipment - roll-in shower chair: a special wheelchair that can get wet.	\$2,500	
6. Ventilator	\$300/month	
7. Backup ventilator	\$300/month	
8. Inexsufflator: cough machine	\$9,000	
9. Hands free telephone system	\$300	
10. Wheelchair accessible van	\$42,000	
Daily Living Assistance		
1. Medicine	\$200/month	
2. Bowel and bladder supplies	\$500/month	
3. Personal Care Assistant	\$20/hour	
4. Therapy (physical, occupational)	\$400/week	
5. Blood pressure cuff	\$50	
6. Medication organizer box	\$7	
	Total cost for one year:	

Task 11: Costs of Daily Living with SCI

Student Task

JARED (L3 Paraplegia)

Typically patients are ready to go home after about two months in rehabilitation. Family and friends must make careful preparations to help the patient with this transition. One of the most critical concerns for daily living is the costs to the families.

Directions: The rehabilitation team has identified the following expenses will be required for your patient. Read through the list carefully looking at the costs of each item. Notice how each cost is reported. Some are one-time costs while some are recurring. Use this information to calculate your patient's expenses for one-year of care on the Task 11 form.

SCI LONG-TERM CARE EXPENSES - L3 Paraplegia		
ITEM	COST	TOTAL COST PER ITEM
Home Modifications		
1. Ramps	\$700	
2. Lower kitchen sink/counters	\$1,000	
3. Widen doorways	\$2,000	
Equipment		
1. Wheelchair, manual	\$2,500	
2. Bathroom equipment - tub bench to sit on	\$100	
3. Leg braces for brace walking	\$1,000	
Daily Living Assistance		
1. Medicine	\$200/month	
2. Bowel and bladder supplies	\$500/month	
3. Therapy (physical, occupational)	\$400/week	
4. Blood pressure cuff	\$50	
5. Medication organizer box	\$7	
	Total cost for one year:	



Traumatic Injury Exhibit and Disability Etiquette



What You Will Do

- Present the story, injuries, impacts, and costs of your case study teen.
- Learn about your classmates' case studies.
- Learn the essentials of disability etiquette.

Why It's Important

- TBI and SCI injuries, impacts and costs are different for every patient.
- TBI and SCI usually come with lasting and significant consequences.
- People with disabilities are people just like you and should not be defined by their disability.



Traumatic Injury Exhibition Rating

Names of Presenters:

Each presentation must include all the elements described on the evaluation form below.

- 1 = Could Be Better; missing or incorrect information
- 2 = Good Job: minor gaps or mistakes in information
- 3 = Way to Go; all elements included

Presentation Elements

- 1. Description of case study patient: Score _____
 - Age
 - Gender
 - Interests
 - Personality

- 2. Narration of injury story: Score _____
 - What happened
 - What risky behavior caused the injury

- 3. Explanation of the patient's injuries Score _____
 - Description of the anatomy involved
 - Explanation of the level of injury

- 4. Explanation of the injury impacts (select those that apply) Score _____
 - Physical
 - Cognitive/Communication
 - Daily Living

- 5. Summary of Rehab activities Score _____

- 6. Cost for Care Score _____

- 7. Presentation Skills: Score _____
 - Organized
 - Clear
 - Participant demeanor

Total Score _____

Name of Rater:

Get it Right: Disability Etiquette Guidelines



What's The Best Way To Think About Someone With A Disability?

- Remember the Golden Rule. Treat others the way you wish to be treated.
- There is much more to a person than their disability. Each person has strengths you can appreciate if you take the time to recognize them. A person with a disability can also be a son, writer, mother, singer, basketball player, engineer and many other things.
- See people with disabilities as ordinary people actively going about the business of living as other people do, not as passive victims, tragic figures, or super-heroes.

How Should I Talk To Someone With A Disability?

- Talk normally, don't talk down to the person and don't raise your voice unless the person asks you to.
- Speak directly to a person with a disability, rather than through a companion who may be along.
- Pay attention and be patient if the person speaks slowly. Wait for the person to finish speaking. Do not finish their sentences or speak for them.
- Don't pretend to understand what someone is saying if you don't. Politely ask them to repeat it.
- Use language that puts the person before the disability and describes what a person has, not who a person, i.e. "has paraplegia", not "is paraplegic" This is called "People First Language."
- Relax. Don't be embarrassed or apologize if you happen to use common expressions that seem to relate to the person's disability, such as "See you later" (to person who is blind) or "I've got to run" (to a person with paraplegia)
- Avoid negative, disempowering words such as "confined, suffers from, a victim of, or afflicted with."

How Should I Act Around Someone With A Disability?

- In greetings, offer to shake hands and be prepared to "shake" whatever is offered to you.
- Always ask if and how you may assist the person; don't be surprised or offended if the person is not interested in your assistance. When you offer to assist someone with walking, allow the person to take your arm. This will help you to guide, rather than propel or lead, the person.
- Ask permission before touching the person or any assistive device, such as a wheelchair or cane. Never move a person's wheelchair or other device out of reach or without permission.
- Make eye contact without staring.
- Don't touch, talk to or try to engage with a service animal.
- Never slap a disabled person on the back or thigh as a goodwill gesture, they could be thrown off balance or have a muscle spasm or seizure.
- Don't make choices for the person who is disabled such as where they should sit at the dinner table. Allow them to make their own decisions.



Complete the following activities as directed by your teacher.

1. Draw a picture of yourself. Cover that picture with all the important people, activities, and interests that you think make you who you are. For example, if you love to swim, add a pool, if you love to read, add a book. Then write 5 adjectives that your best friend might use to describe you.

Next draw a second picture of yourself. On that picture, write only ONE item from the first picture. Compare the two pictures and reflect on how each one makes you feel. Write a paragraph explaining which one you prefer and why.

Explain how someone might feel when they are defined only by their disability.

2. Reflect on any incidents you may have seen at school, the mall, church or somewhere else where a person with a disability was being treated in ways that might make them feel uncomfortable? With a partner, describe what happened. Explain how you could “redo” this event using what you’ve learned about disability etiquette. What would you do differently (even if the event didn’t involve you).
3. Select one person in your group to role-play a person with a disability; this person could be the teen in your case study. Create two situations where the group members interact with the person with the disability. The situations can display either appropriate or inappropriate etiquette. Act out your situations for the rest of the class. The class will have to determine what kind of behavior is being portrayed – appropriate or inappropriate etiquette.
4. Write a letter to a sibling or a friend who has not been in this class. Explain to them the most important things you have learned about how to think about, talk to and act around someone with a disability.



“You’ve Got a Friend in Me” Being an Injury Prevention Advocate



What You Will Do

- Investigate the relationship between friendship and keeping friends safe.
- Learn the importance of “advocacy.”
- Create skits about injury prevention.

Why It’s Important

- You have been given an advantage of special knowledge during this study of TBI and SCI.
- You can now use this knowledge to help keep yourself, friends, and families safe.
- You can become an injury prevention advocate by promoting safety.
- You can avoid risky behavior and discourage others from doing risky things.



Task 13: Being an Injury Prevention Advocate

Student Task

Directions: Create a skit that portrays an effective safety message and shows others how to be a good injury prevention advocate. Use one of the scenarios below as directed by your teacher. Be sure the skit includes these three essential characters:

- Risk taker
- Safety advocate
- Encouragers of risk (may be several characters)

Also use at least two of the safety messages listed on the next page.

Advocacy Skit Scenarios

1. You and your friends are all at the pool. One of them suggests having a contest to see who can dive from the shallow end all the way to the deep end.
2. You're at your friend's house with a group of friends. She has a trampoline with no safety nets. She and the others are jumping enthusiastically and doing flips. They all want you to join in.
3. You're with some high school kids and one of them has a pickup truck. A bunch of you want to go to the movies but there's not room for everyone in the truck. The driver tells you and some other kids to hop in the truck bed.
4. You're about to go for a bike ride with a group of friend. Your friends are not wearing helmets. They all urge you not to wear yours. They think helmets are stupid and they don't want to be seen riding with you wearing one.
5. You're in the car with your dad and siblings. Your dad is not wearing a seatbelt and never cares if others do.
6. You're going out to the mall with friends. Your cousin is driving on the highway and going 15 miles over the speed limit.
7. You're heading to a state park with your family. Your mom is driving and does not know the way. She keeps looking at Google Maps on her phone as she drives.
8. You and your friends have just left school and are walking to get ice cream a few blocks away. As you come to a busy intersection, several of your friends run across the street. One of your friends is lagging behind, walking with you but not paying attention because she is texting a boy. Everyone across the street is yelling for you guys to hurry up and cross. The light is changing and your texting friend is not paying attention. She responds to the urging of others by stepping into the intersection as cars are coming.

Student Task

Advocacy Safety Messages

Directions: Translate each of the following messages into words you feel comfortable with. Use at least two of these messages in your skit.

1. I don't feel safe when you... It is not safe for you to _____
2. I'm scared _____ you're scaring me _____ this is scary...
3. I don't want to get hurt _____ I don't want you to get hurt...
4. I don't want to get in trouble _____ grounded _____ pulled over _____ a ticket...
5. I'm not allowed...
6. I knew someone who got hurt this way _____ I took a class and met some people who did these things and got hurt...
7. Even if you text/talk/eat/put on makeup really quickly you can still cause an accident. Taking your eyes off the road is very dangerous...
8. It's not worth the risk to me _____ You should not take that risk...
9. You're putting me in danger and I need to have a say in that...
10. You could get seriously hurt doing that...



Advocacy Skit Rating

Names of Performers:

1. The skit included the three assigned characters. Points Earned _____

- Risk taker (5 points)
- Safety advocate (5 points)
- Encourages of risk (5 points)

2. The skit included at least two safety messages Points Earned _____
(5 points each)

3. Group members displayed appropriate behavior when presenting the skit. Points Earned _____

- All members did so = 5 points
- Some members did so = 3
- No members did so = 0

4. The skit provided a model for TBI and SCI advocacy that I could use. Points Earned _____

- Yes = 20 points
- Perhaps = 10 points
- No = 0

Total Points Earned _____

(Total possible = 50)

Name of Rater:



LESSON 10

Promoting Injury Prevention in the Community



What You Will Do

- Study popular injury prevention posters.
- Create an injury prevention message that will help your community stay safe.
- Design an injury prevention poster to display in your community

Why It's Important

- You have been given an advantage of special knowledge during this study of TBI and SCI.
- You can now use this knowledge to help keep yourself, friends, and families safe.
- You can become an injury prevention advocate by promoting safety.



Task 14: Creating An Injury Prevention Poster

Student Task

Continue your injury prevention advocacy by creating an injury prevention poster for your neighborhood or community that will appeal to teens and young adults. This poster should target prevention of an injury you have learned about during this unit.

Follow these steps to complete this task:

Select the type of injury you want to prevent and identify the cause of that injury:

1. List the causes of TBI or SCI you have learned during this unit.
2. Analyze the list to identify potential candidates for a prevention campaign.
3. Select one cause for the focus of the injury prevention poster you will to create.

Design the Poster:

1. Brainstorm ideas for effective messages that will get the attention of teens and young adults.
2. Select the best idea for the poster.
3. Brainstorm ideas for visual elements that will help deliver this message. Consider the following:
 - a. Do you want people, objects, or symbols depicted on the poster or words only?
 - b. Where will you place the elements you want and how large should each be?
 - c. What colors will be most appealing?
 - d. Will there be a border around the poster?
4. Finalize the design.

Create the poster using available technology or art supplies.

TEAR ALONG LINE TO DETACH RATING FORM

Poster Creator(s): _____

Injury Prevention Poster Rating

Rate each poster presentation using this scale:

1 = unsatisfactory, 2 = satisfactory, 3 = good, 4 = very good, 5 = excellent.

1. The message targets the causes of injuries we have studied. _____
2. The message is clear and effective. _____
3. The message makes me think about injury prevention. _____
4. The design is attractive and eye-catching. _____
5. The message could convince a young person to avoid risky behavior _____

Evaluators: _____

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Shepherd Center

