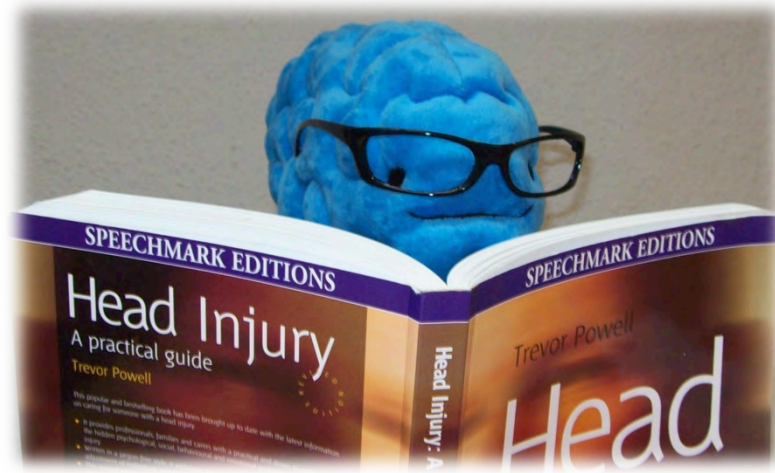


Brain Injuries and their effects



December 5th 2013



1. What is a brain injury?
2. How does the brain work? Anatomy 101
3. How is brain injury severity measured?
4. What are some of the common effects of brain injuries and strategies to deal with these?

Fun Facts on the Brain

- Accounts for 2% of total weight of human body, but accounts for 20% of its blood and oxygen use
- The human brain has around 100,000,000,000 (10 billion) brain nerve cells



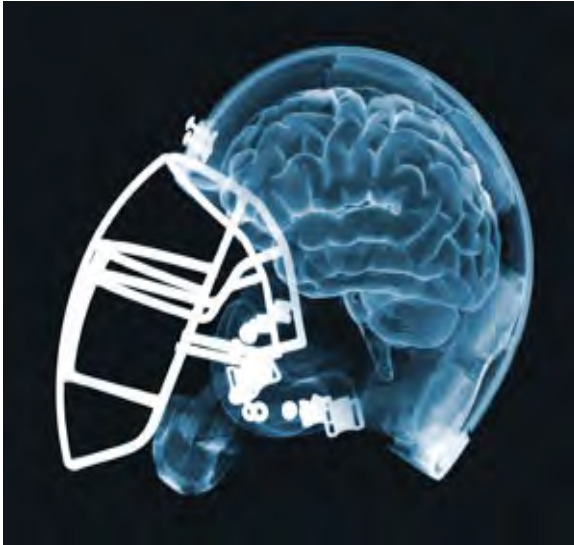
Definition of Brain injuries

Injury that causes damage to the functioning of the brain:

- Our thoughts & feelings
- Our strength & motion
- Our interaction with others

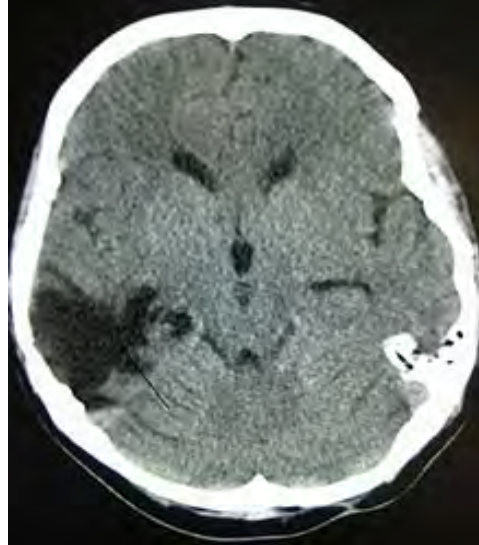


Brain injuries: what are they?



TRAUMATIC

- hitting head
- violent shaking
- whiplash



STROKE

- Lack of blood supply to brain

LACK OF OXYGEN

- Drowning
- suffocation

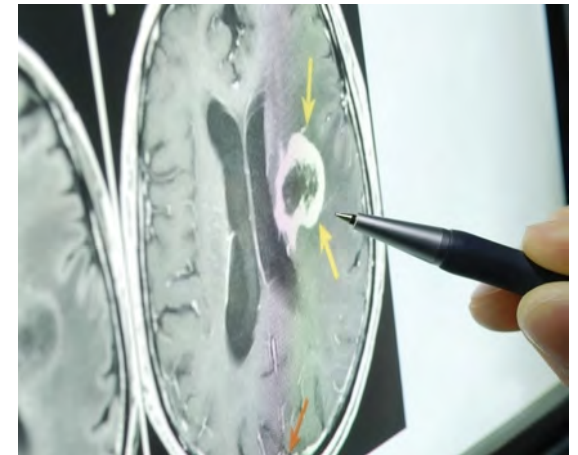
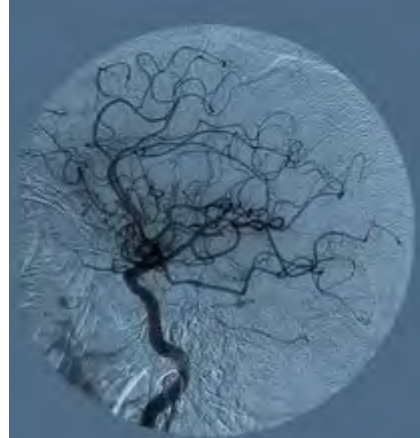


INFECTION

- meningitis
- encephalitis

How is the brain injured?

- Bruising
- Bleeding
- Brain swelling
- Fever
- Lack of oxygen or blood (*Hypoxia*)
- Shearing or tearing of brain nerve cells with rapid movement
- Increased pressure inside the skull (*intracranial pressure*)
- New growth taking up space in the brain – example: tumor or abscess



Acquired Brain Injuries

- Up to 22,000 British Columbian's get new brain injuries each year
- 160,000 British Columbian's live with the impact of brain injuries

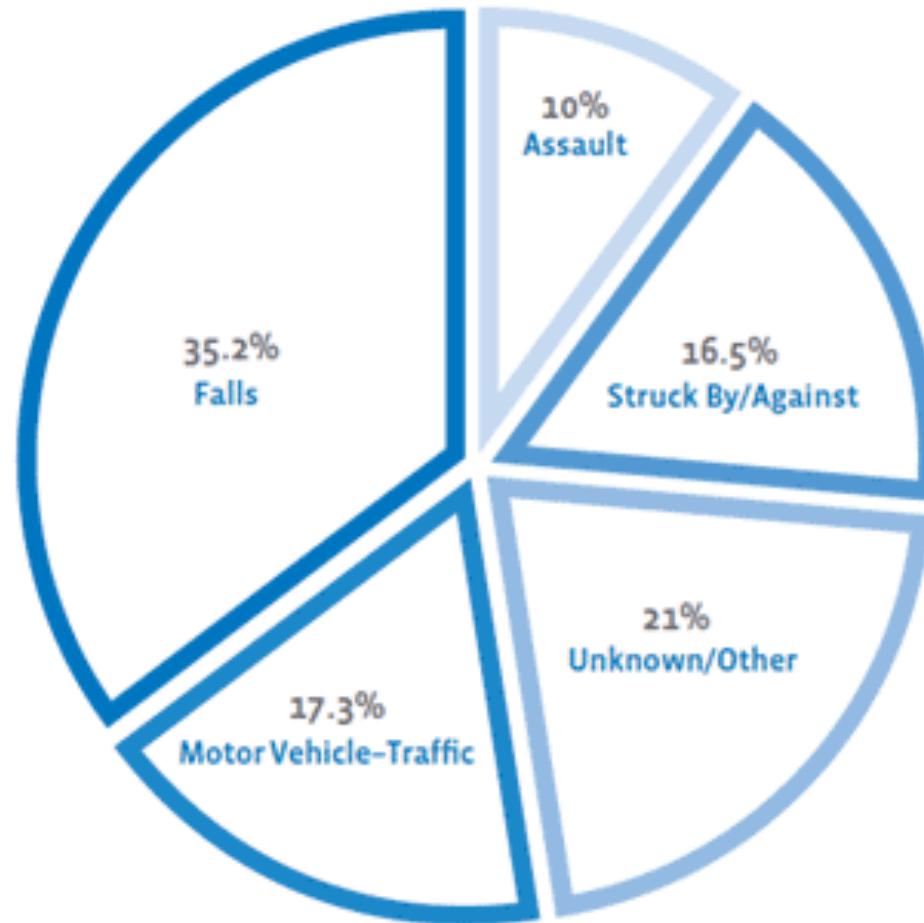


Traumatic Brain Injuries

- It is the leading cause of death and disability for people under the age of 40
- After one brain injury, you are at three times greater risk for a second injury



Different causes of traumatic brain injury



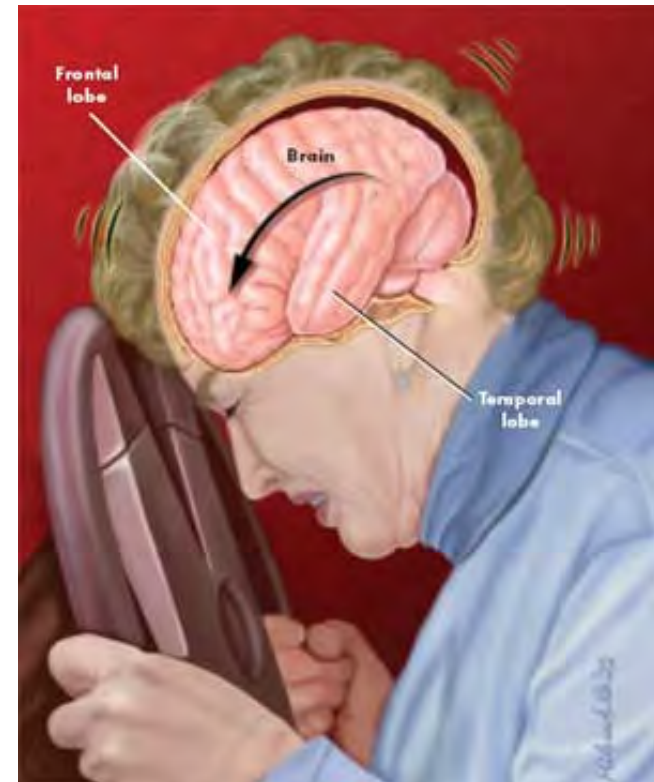
“Just as no two people are alike, no two brain injuries are alike.”

- Because each injury does damage to different parts of the brain, every brain injury will be different



Local vs Widespread Damage

- **Local** damage means only certain parts are affected. This often means only very specific functions are affected
- **Widespread** damage means many parts of the brain are affected and the survivor may notice many changes



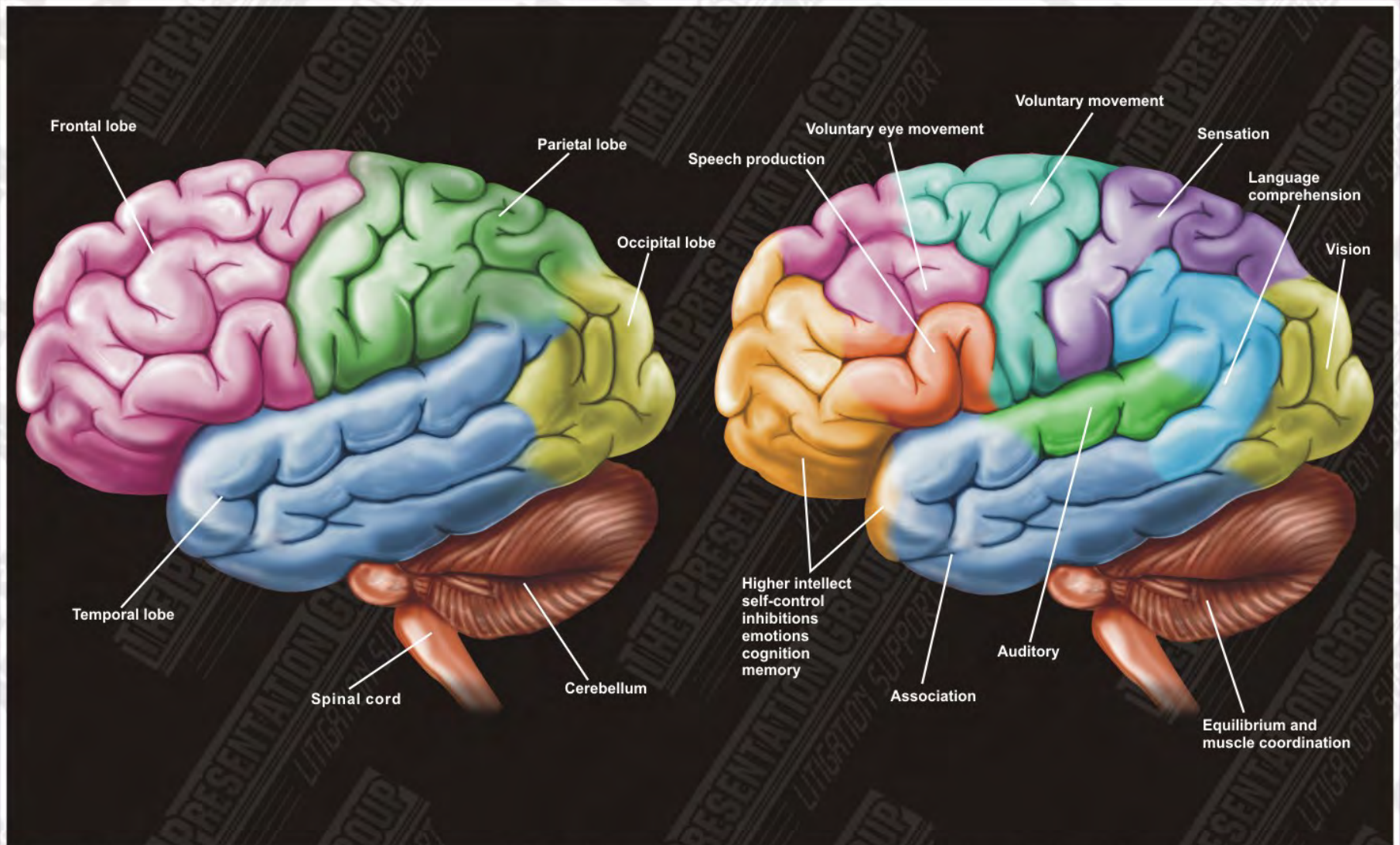
Eg. Car Crash

Parts of the Brain

- Different parts of the brain help you do different things
- Depending on what part is affected a person may have different symptoms after brain damage



FUNCTIONS OF THE BRAIN



Frontal lobe

- Plan and organize
- Solve problems
- Pay attention and shift attention
- Control impulses
- Get started on tasks
- Self-awareness of strengths and weaknesses
- Awareness of other people's thoughts and feelings



Frontal lobe

Phinneas Gage 1848



Parietal lobe

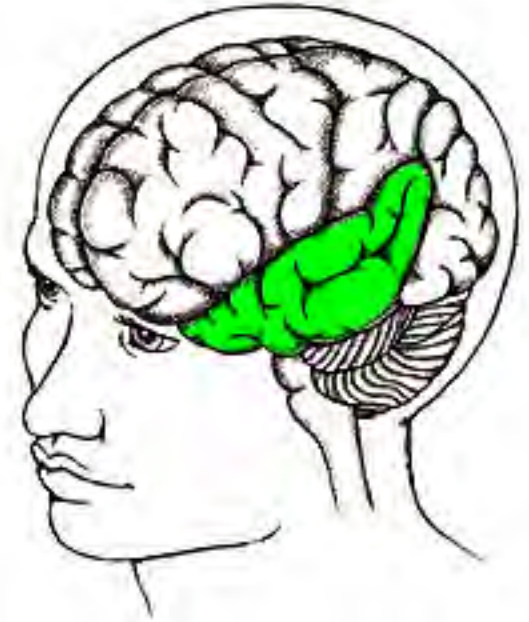


Sight, hearing and touch are brought together

- Eg. distinguishing textures
- Knowing where your body parts are
- Knowing where you are
- Hand-eye coordination
- Drawing
- Reading, writing, math problems

Temporal lobe

- Helps you remember things you see and hear
- Both sides: help feel emotion
- Right side: recognizing and remembering faces, pictures and sounds
- Left side: talking, understanding what you hear, doing math



Occipital lobe

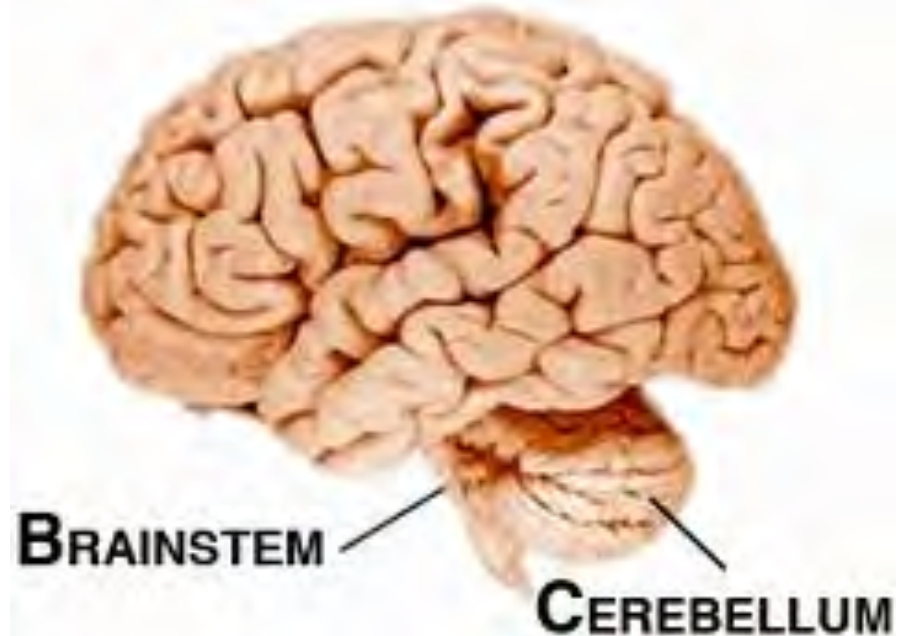
- Helps brain understand what the eyes see
- There's a stronger signal in the occipital area with many psychedelic drugs



Cerebellum and Brain Stem

Cerebellum: makes movements smooth and coordinated

Brain stem: controls the automatic bits like breathing, your heart, and how awake you are



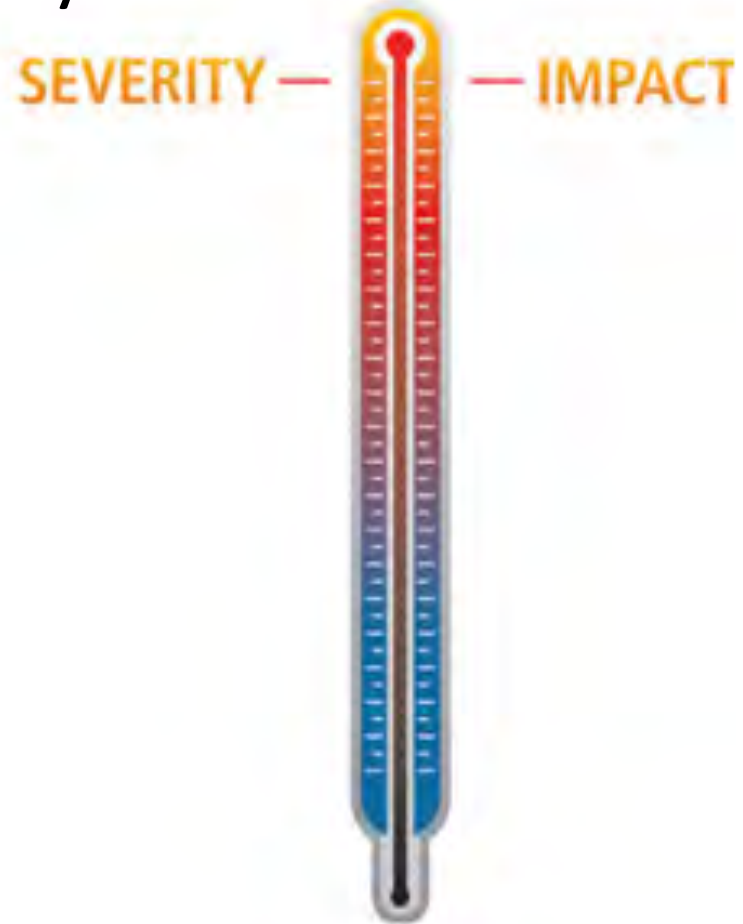
How is Severity Determined?

Immediately following the injury:

1. Ability to respond

GCS score:

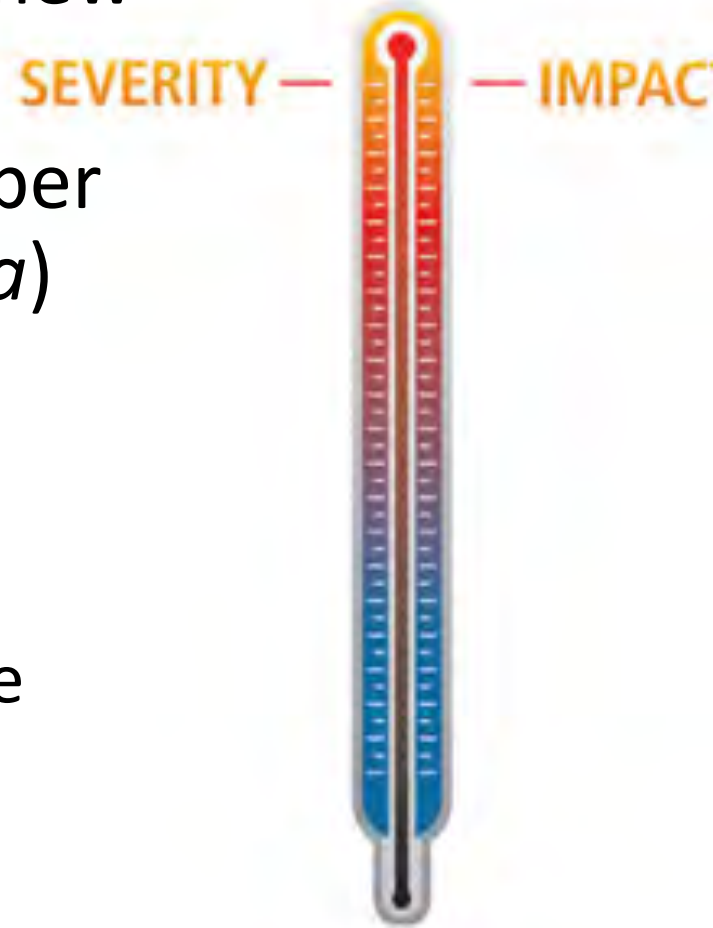
- Talking
- Eye contact
- Movement



How is Severity Determined?

2. Ability to remember or learn new information

- Often people cannot remember what just happened (*amnesia*)
- How long this lasts suggests severity
 - More than 24 hours is severe
 - 1 hour to 24 hours is moderate
 - Less than 1 hour is mild



How bad is it?

- Severity is a good predictor of recovery
- How the survivor is doing at the time of injury is a measure of how they will do in the future....
- But not a perfect measure
- Each injury is unique



Mild brain injury

- Usually do not require hospitalization
- Brief loss of consciousness, dizziness or memory clouding that recovers within a few days to months
- No abnormal medical tests
- Full recovery expected (may take time until symptoms completely resolve)
- “Concussion”

Minor head injury

Headaches

Mental clouding
Cognitive difficulty

Emotionally volatile



Moderate Brain Injury

More symptoms that interfere with daily life

- Physical problems
- Problems with everyday living
- Problems with emotional control
- Problems with motivation and self-control
- Social problems

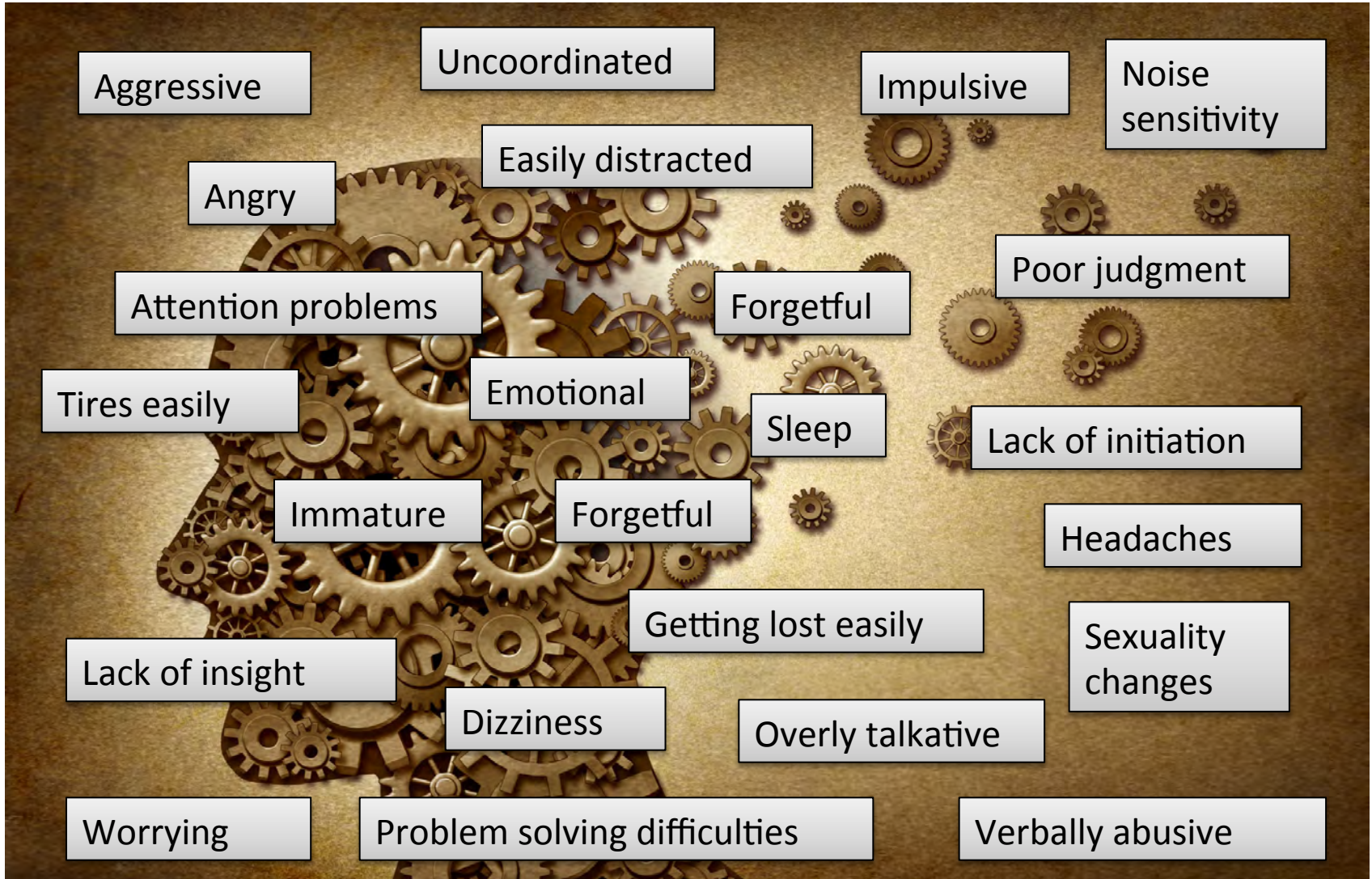
Recovery may take months or some changes may be permanent

Survivors may require ongoing supports

Severe Brain Injury

- Same type of symptoms as moderate injuries but:
 - More symptoms
 - Longer lasting
- Greater physical disability, for example needing to use aids like wheelchairs and speech synthesizers
- More changes to thinking ability

Common effects of brain injury



Common effects of brain injury

PHYSICAL

Headaches

Dizziness

Fatigue

Depression

Seizures



LIFESTYLE

Alcohol and drugs

Sexuality changes

Nutrition

Headache



Tension Headache

- Pressure and tightness on both sides of head
- Muscle tension in shoulder, neck and head
- Over-stimulation of pain receptors
- Heightened sensitivity to pain

Migraine Headache

- Headache with nausea, light and sound sensitivity
- May be due to damaged blood vessels in brain
- Inflammation of membranes in the brain

Rebound Headache

- Caused by overuse of pain-killer medication
- Increases the body's response to pain, making pain more pronounced.

Headache - treatment

Tension Headache

- Physiotherapy
- Exercise
- Sleep position
- Massage
- Heat pads
- Eyes glasses
- Take stretch breaks while reading or on the computer

Careful use of pain medication

Migraine Headache

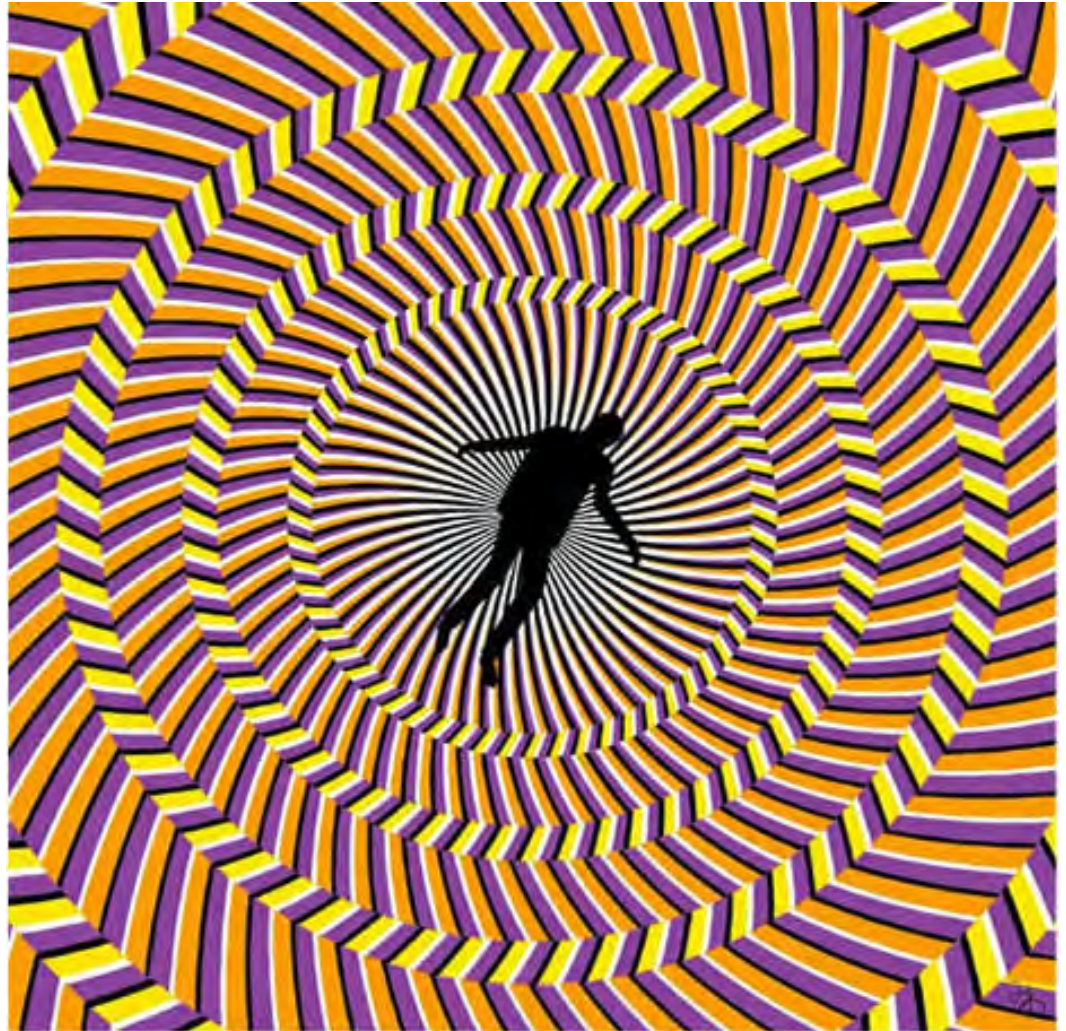
- Discover your own triggers
- With new migraine go to quiet dark room
- Deep breathing
- Stop smoking
- Medication to treat migraine*
- Medication to prevent migraine*

Rebound Headache

- Keep track of # pain killers taken
- See your doctor for a plan on changing medication and/or cutting down

Dizziness and Imbalance

- 30-65% of people report dizziness following brain injury
- Often has deep impact on day-to-day function



Dizziness and Imbalance

Common causes



Medication

Go to your doctor for a review of meds



Sudden drop in blood pressure

Careful getting up from lying or sitting

Keep well hydrated

See your doctor



Loss of vision

Get your eyes checked

Dizziness and Imbalance

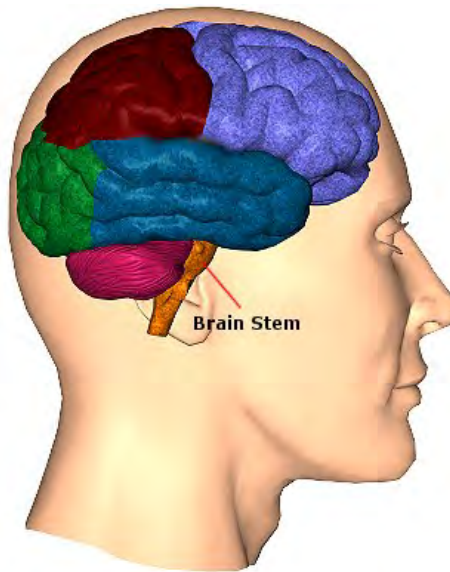
Common causes



Damage to the inner ear

- To the structure itself
- To the nerve
- From fluid buildup

The organ in charge of position and balance



Brainstem Injury

Causing difficulty walking and balance problems



Mental Health

Anxiety, depression, fear – all can disrupt the way your senses work.

Dizziness and Imbalance

How to improve



- Stretching and flexibility
- Practice standing & walking in different ways (eyes closed, on one foot)
- Tai Chi
- Physiotherapy
- Occupational therapy



Fatigue

In up to 70% survivors

1) Physical fatigue

- I'm tired
- I need a rest

2) Psychological fatigue

- I'm worn out
- I can't do any more

3) Mental fatigue

- I can't concentrate anymore
- My mind goes blank



Fatigue

Muscle weakness

Your body works harder to do things after brain injury

- Improves over time
- Improves as you do more physical activity
- Is helped by good night sleep

Psychological fatigue

Associated with mental health

- Depression
- Anxiety
- Worsens with stress

Waking up in AM with fatigue

Mental Fatigue

Your brain is working harder after injury

- Tasks require more concentration than usual
- Extra effort to stay focused

Fatigue – How to improve

Sleep and rest

Exercise daily

Regular schedules

Start with easy tasks

Gradually increase activity

Take plenty of breaks

Prioritize your activities

Tune into your mental health



Seizures

Head injuries lead to seizures 15% adults and 30% children

Healing: Rebuilding of connections
and circuits in brain:

- Strength

- Memory

- Speech

Over-excited circuits are prone to seizure

Epilepsy = recurrent seizures

Seizures

Seizures can happen shortly after injury, or even years after injury

Some seizures involve full body shaking and spasm
Others are very subtle

- Periods of “spacing out”
- Periods of unexplained changes in behaviour

Prevention of seizures:

- Lifestyle
- Medications

Depression

Sadness

Withdrawing
from others

Guilt

Hopeless

Loss of interests
Loss of pleasure

Despair

Appetite changes

Sleep changes

Tired
Low energy

Moving slowly
Restless, fidgety

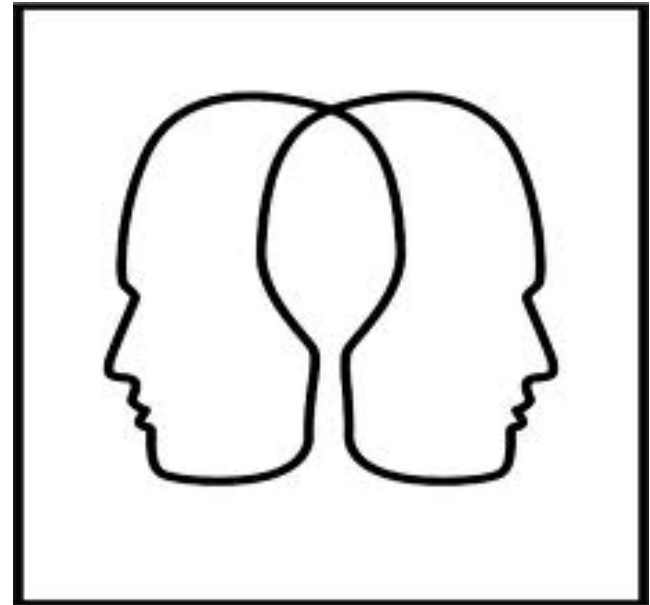
Thoughts of
suicide

What causes depression?



Physical changes to the brain after injury

A change of normal brain chemistry



Emotional response to injury:

- Change of role
- Loss of function
- Adjustment to disability

Managing depression



Cognitive and behavioural therapy:

- Changing the way you behave, think and feel about the world around you
- Change the way you see the world

Talk to your doctor about various therapy options

Managing depression



Antidepressant medications

- Restores normal brain chemistry
- Can be used for short-term (6-12 months)
- Can be used indefinitely

Other options:

- Acupuncture, exercise, brain injury support groups

Changes in Nutrition

- Brain injury can change body's nutrition

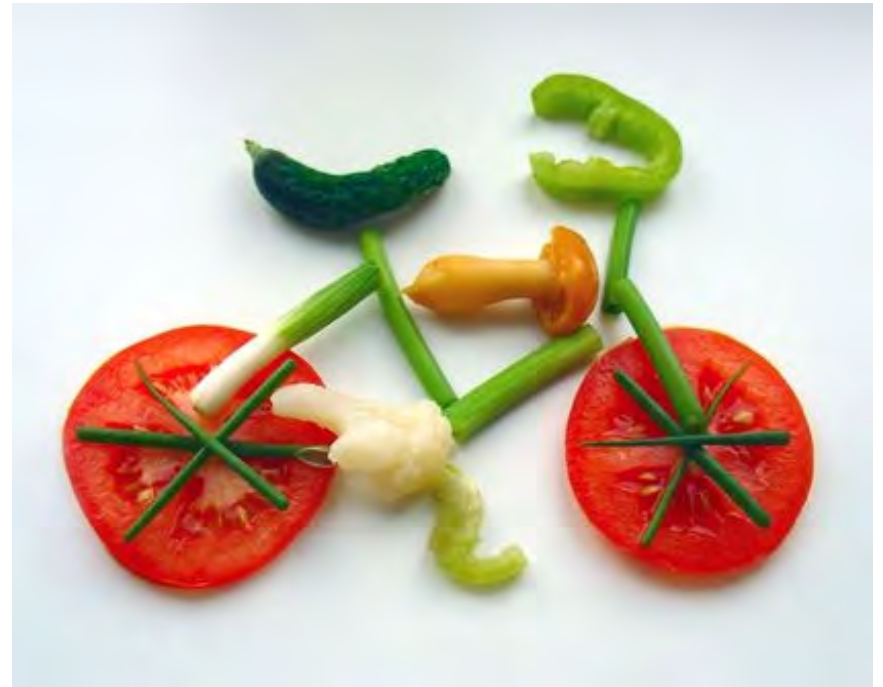
Eating excessively without noticing

Not eating enough, without noticing

- **PLAN:**

Create a meal plan

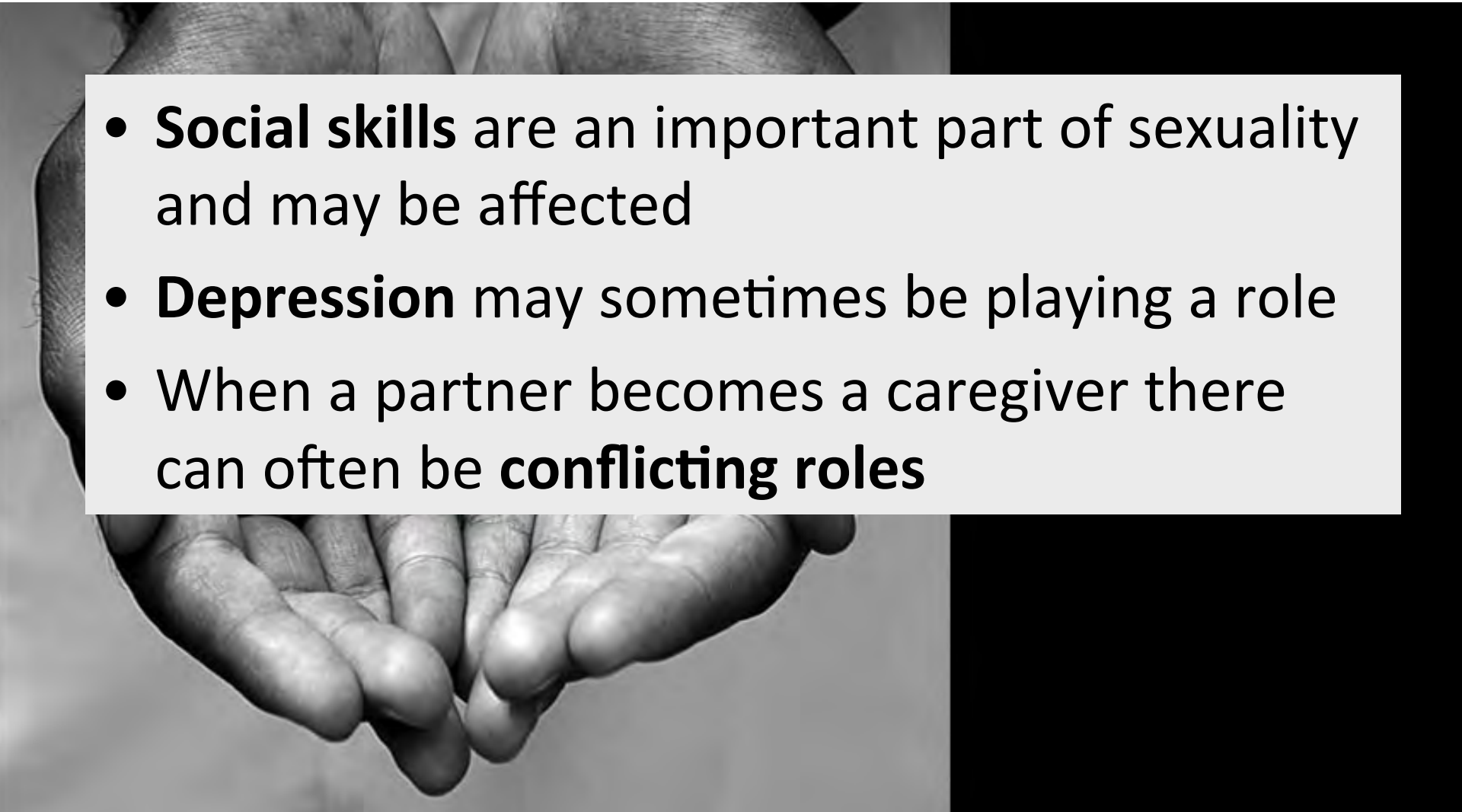
Set up an exercise schedule



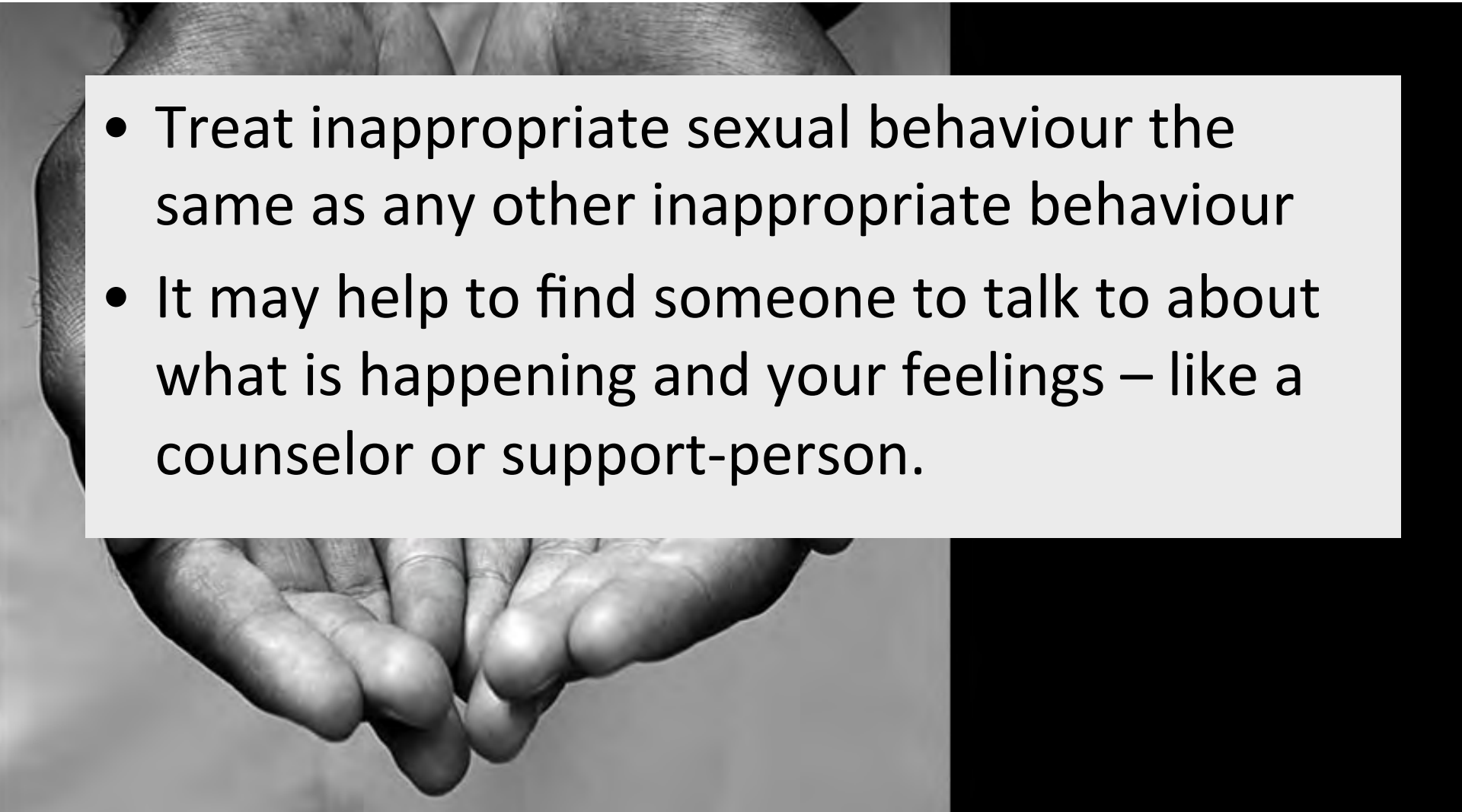
Changes in Sexuality

- Impact depends on person
- Common changes:
 - Decrease in interest OR
 - Uninhibited behaviour in inappropriate situations
 - Eg. Bluntly telling someone they are attractive
 - Eg. Interpreting friendliness as a sexual approach

Changes in Sexuality

- 
- **Social skills** are an important part of sexuality and may be affected
 - **Depression** may sometimes be playing a role
 - When a partner becomes a caregiver there can often be **conflicting roles**

Coping with Changes in Sexuality

- 
- Treat inappropriate sexual behaviour the same as any other inappropriate behaviour
 - It may help to find someone to talk to about what is happening and your feelings – like a counselor or support-person.

Alcohol and Drugs

- Alcohol affects the brain's ability to function
- Effects of alcohol are greater after brain injury

Limits recovery

Makes it harder to think and learn new things

Increases the chance of depression

Increases the chance of seizures



Increases the chance of another brain injury

Alcohol and Drugs

- Street drugs, like cocaine and marijuana, have the same risks
- PLAN:
 - Some people may need the help of an experience counselor
 - Family may choose to help by not drinking themselves



Rehabilitation



Based on individual needs

From home or from within a care facility

Focus on:

- Speech, communication
- Physical
- Memory and cognition
- Mental health

Fraser Health Acquired Brain Injury program

“Life and independence” can be the most effective therapy

Qualities needed to rebuild skills



Recognizing
own abilities

- Present,
- Somewhat
lacking
- Absent

The push to do
things **we want**
to do.

Commonly
lacking after
brain injury

Not wanting to
do what is
expected or
asked.

Learned
helplessness

How caregivers can help



- Involve survivor in planning the rebuilding of skills
- If conflict arises, don't be shy to invite a 3rd party to help address differences
- Have survivor and caregivers both rate what they feel is most important skill to be learned, and how well they feel it is being learned
- Involve a counselor to help work through conflict

What we have covered

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2. How does the brain work?
Anatomy 101
3. How is brain injury severity measured?
4. What are some of the common effects of brain injuries and strategies to deal with these?



QUESTIONS?

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