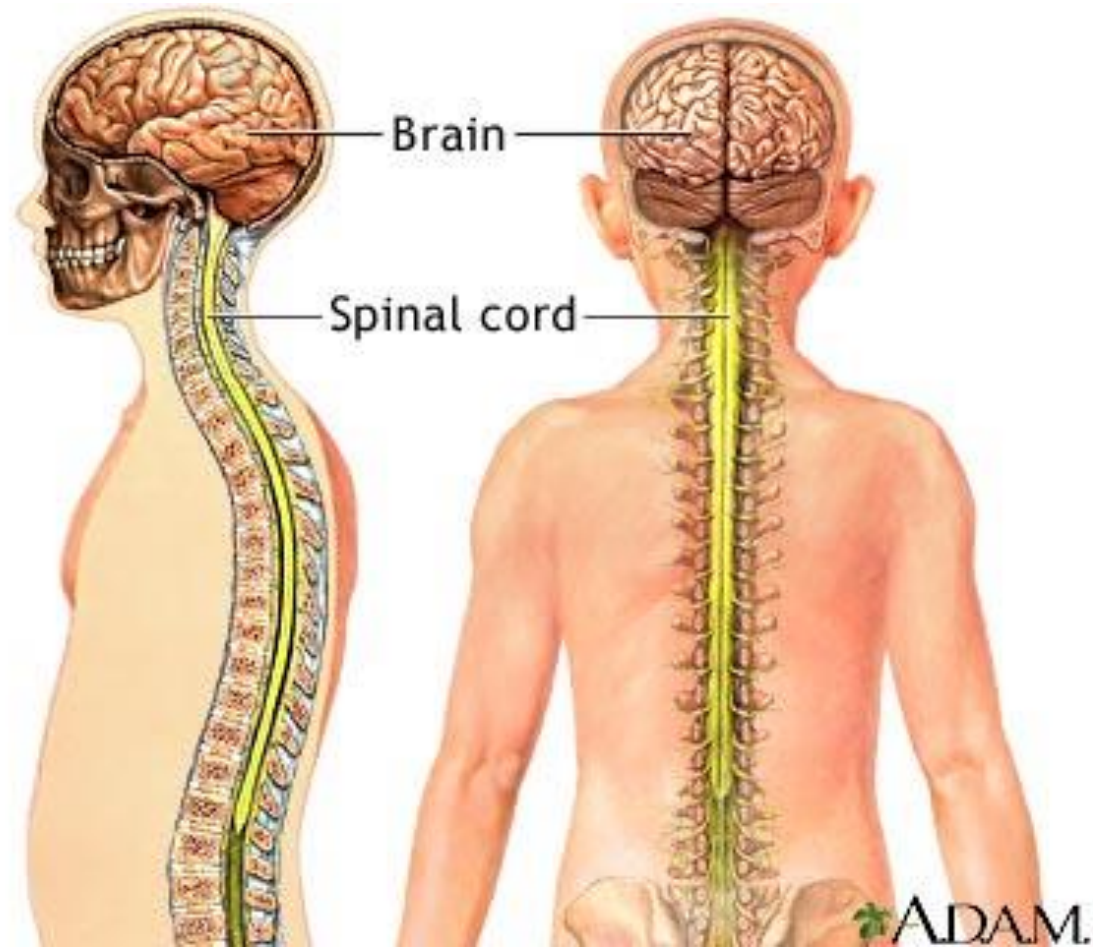


Understanding your Spinal Cord Injury

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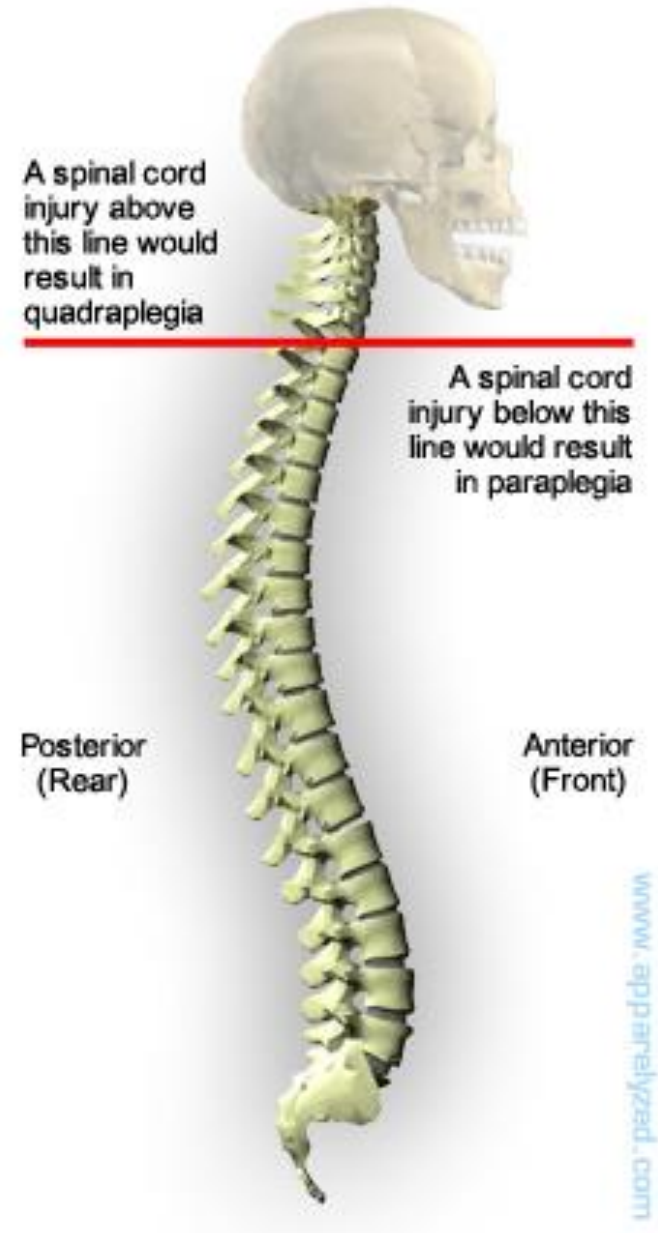
The Spinal Cord

- The spinal cord is about 18 inches in length.
- The brain and the spinal cord constitute the Central Nervous System.



- The spine is made up of bones, ligaments (tissue that connects the bones) and discs.
- The spinal cord is a collection of nerves that carry messages from the brain to the rest of the body.
- You can think of the spinal cord as a big electrical cable made up of lots of wires that sends information to and from the brain. It is protected by rings of bone called vertebrae which go round the spinal cord. There are 33 of these bones (or vertebrae) in the spine.

- ❖ Spinal nerves exit and enter at each vertebral level and communicate with specific areas of the body
- ❖ The spinal cord carry nerve impulses to and from the brain to the rest of the body.



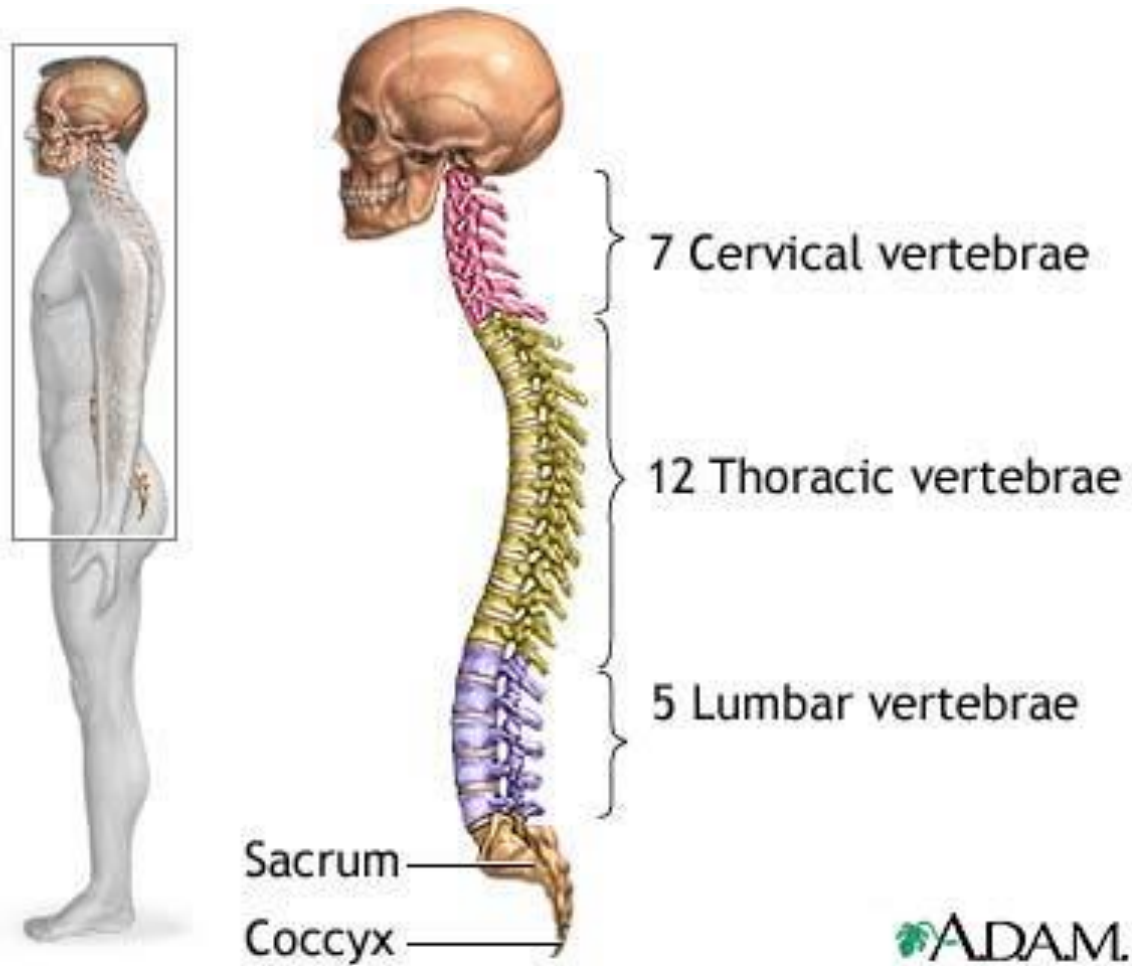
A spinal cord injury (SCI) is when the spinal cord is damaged

➤ **Such damage causes 3 things:**

1. loss or change of movement (paralysis)
2. loss or change of sensation (feeling)
3. loss of control of how the body works internally (autonomic changes)

➤ **It can happen in different ways:**

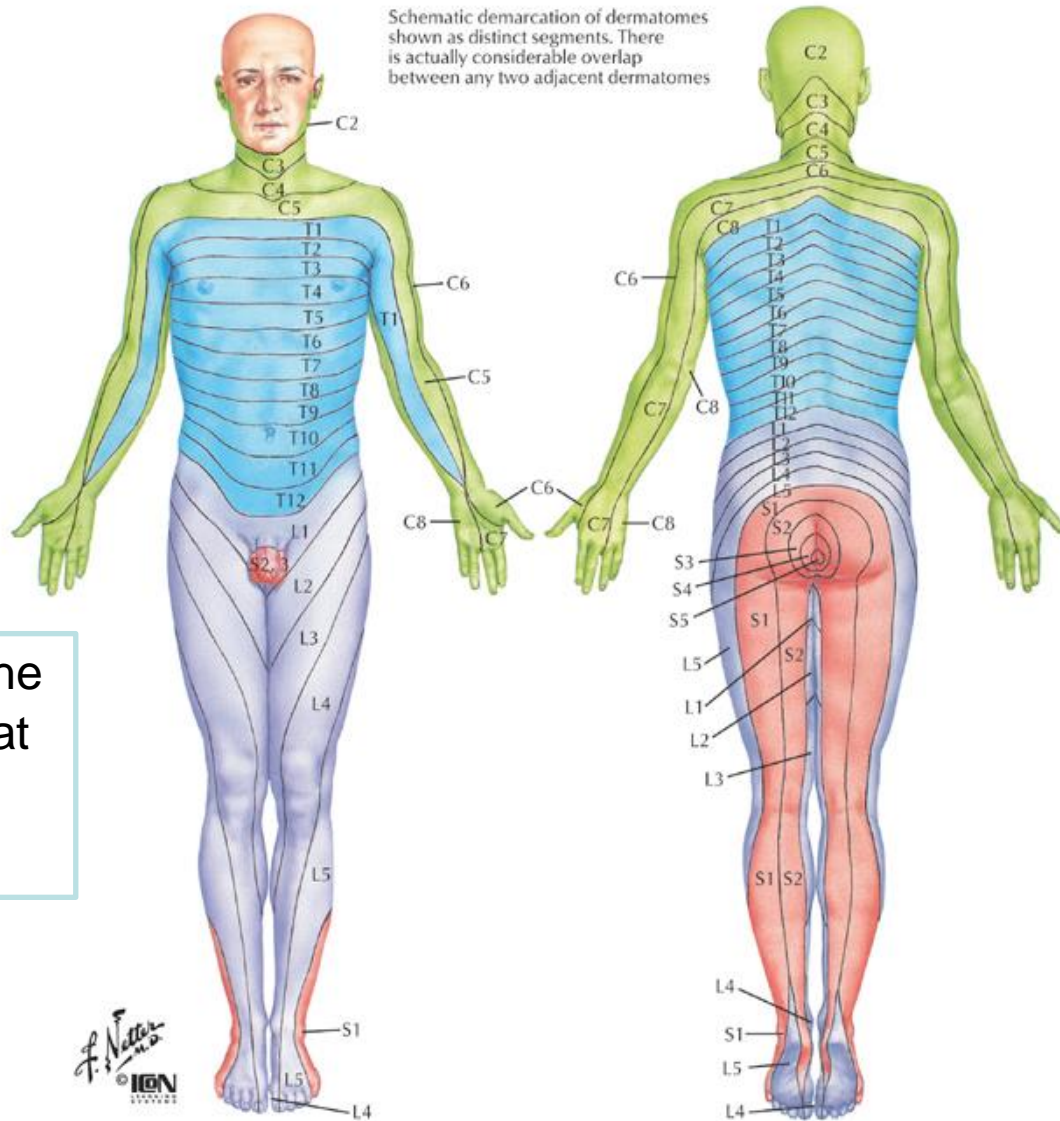
- Road traffic accident
- Falls
- Infection
- Sport
- Illness / Tumour



What are the effects of a spinal cord injury?

- Messages to and from the brain may not get past the damaged part of the spinal cord.
 - This may cause a loss of change in sensation and/or movement.
- The higher the injury, the more someone's body is affected.
 - That means that if your injury happens higher up your back or neck, it is likely you will experience more loss of physical feeling and movement.
What we call the level
- It is important to be aware that the loss of movement and sensation will vary from person to person, even with those who have damaged their spinal cord in the same place (this is what we call the 'severity')
- Bladder, bowel and sexual functions will be compromised
- Any skin damage will take longer to heal
- Respiratory needs change too. Some people may require additional oxygen delivered through their ventilator (Usually above C4/5 level)

Schematic demarcation of dermatomes shown as distinct segments. There is actually considerable overlap between any two adjacent dermatomes



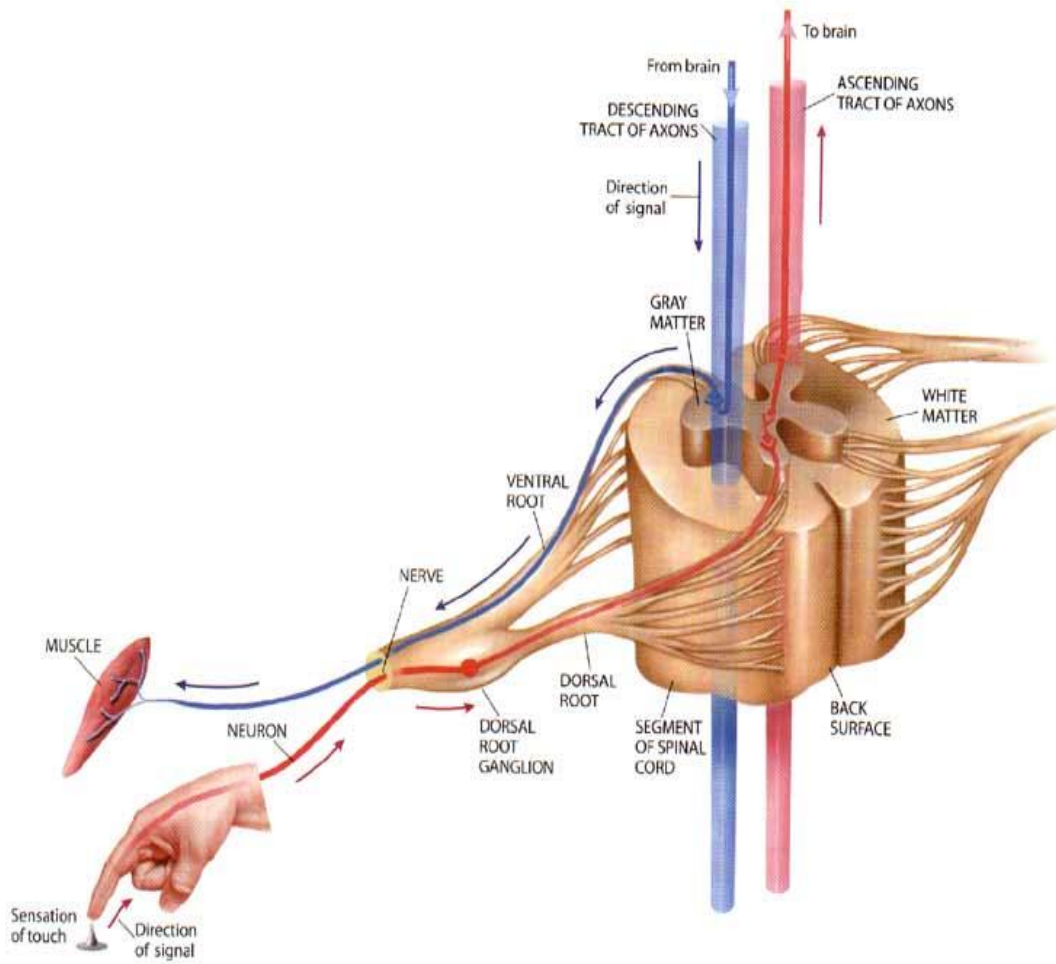
This picture shows the areas of the body that are affected by your level of injury

F. Netter M.D.
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Levels of principal dermatomes

- C5 Clavicles
- C5, 6, 7 Lateral parts of upper limbs
- C8, T1 Medial sides of upper limbs
- C6 Thumb
- C6, 7, 8 Hand
- C8 Ring and little fingers
- T4 Level of nipples

- T10 Level of umbilicus
- T12 Inguinal or groin regions
- L1, 2, 3, 4 Anterior and inner surfaces of lower limbs
- L4, 5, S1 Foot
- L4 Medial side of great toe
- S1, 2, L5 Posterior and outer surfaces of lower limbs
- S1 Lateral margin of foot and little toe
- S2, 3, 4 Perineum



This diagram shows how information about touch, pain and pressure travels to and from the brain through the sensory nerves, the spinal cord and the motor nerves.

When the spinal cord is damaged it may have difficulty in transmitting information.

So your reflex to remove your hand from something burning might be lost.

You might not know whether it is hot or cold or where your body is in space. They are all considered sensory loss.

- It can also affect all of our **body systems** because our spinal cord carries all the information between the brain and the rest of the body.
- Organs such as our stomach, bladder, bowel and lungs can be affected. Bowel and Bladder are affected after a SCI even with Cauda equina patients or patients who are able to walk.
- Other problems may include not being able to sweat or control our temperature properly, having low blood pressure and experiencing pain in an area without proper feeling.

- When coughing is impaired due to paralysis or weakness of the abdominal muscles, pulmonary secretions need to be removed with suction.
- Suctioning should be carried out frequently, in order to keep your mouth clear
- The abdominals are the main muscles that create a strong cough.
- If your injury is above T6 you will have a weak cough.
- You may need assistance with your cough to clear respiratory secretions or if you choke on some food.
- You will be taught all about this



Tetraplegia

- Any injury between C1-C8 (the neck area)
- Also known as Quadriplegia - means that the legs, arms, stomach and some chest muscles may be paralysed.

Paraplegia

- Any injury T1 and below (all T,L,S levels)
 - It means that chest muscles and legs may be paralysed.
- **Both Tetraplegia and Paraplegia will involve bladder and bowel changes**

ISNCSCI - Complete and Incomplete

- We use a special scale called the ISNCSCI Impairment Scale to describe the type of spinal injury you have.
- ISNCSCI is the International Standards for Neurological Classification of Spinal Cord Injury
- It used to be called ASIA, the American Spinal Injury Association score.
- It refers to the type of injury you have sustained:
 - If both sides of your body are affected and there is no muscle function or voluntary movement or sensation from the injury level and below, then your injury is **complete**.
 - If you have some muscle function below your injury, such as being able to move one limb or you still have some sensation, then your injury may be **incomplete**.

Prognosis in SCI

- Diagnosis is the combination of all the facts to tell someone what is wrong. (e.g. C3 A).
You should know this and be ready to repeat it to any medical staff.
- When we know the diagnosis, we then assess what the injury actually means for that person for the future.
This is the prognosis.
- This is based on the examinations and tests performed to know how severe the injury is and this can be used to attempt to predict what to expect.
- It is very rare that it can be accurately decided early after injury, but requires repeat assessment by the medical staff.
- Every injury is different.

Autonomic Dysreflexia

- A well-documented complication of SCI at or above T6 level associated with ***an uncontrolled rise in blood pressure/ high BP.***
- The higher the level of the SCI, the greater the degree of clinical manifestations
- AD is three times more prevalent in tetraplegics with a complete injury, in comparison to those with an incomplete

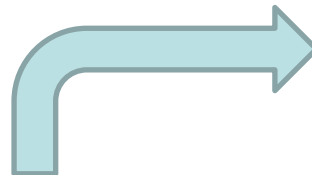


Symptoms of AD

- **Hypertension** - High blood pressure
- **Bradycardia** – Slow heart rate
- **Pounding frontal headache**
- **Blotching of skin, flushing, sweating above level of injury**
- **Nasal congestion**
- **Pilo erection and goose pimples below level of injury**
- **Blurred vision**
- **Chills without fever**
- **Apprehension or anxiety**
- **Cardiac arrhythmias**



**Know your
normal BP**



**AD is a medical
emergency**

What is causing it?

Urological causes

- Bladder distention
- UTI
- Bladder/ kidney stones
- Shock wave lithotripsy
- Urological procedures

Gastrointestinal causes

- Faecal distension
- Appendicitis
- Gall stones
- Gastric ulcer
- Haemorrhoids
- Abdominal distension or impaction
- Digital stimulation during bowel care

Skin

Tight clothing, blisters, pressure ulcer, bums, sunburns, ingrown toenails, insect bites, cellulitis, sharp object contact

Reproductive

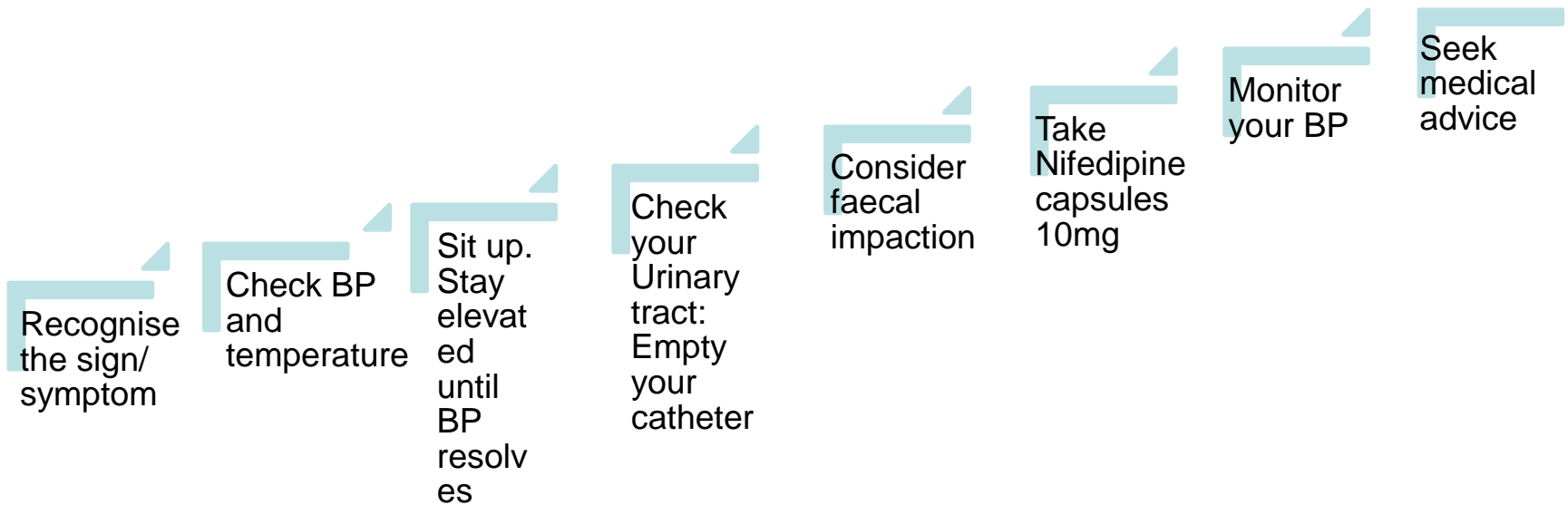
Sexual intercourse, menstruation, pregnancy, labour etc.

Other

Deep vein thrombosis, fracture, trauma, surgical and invasive procedures, bursitis etc.

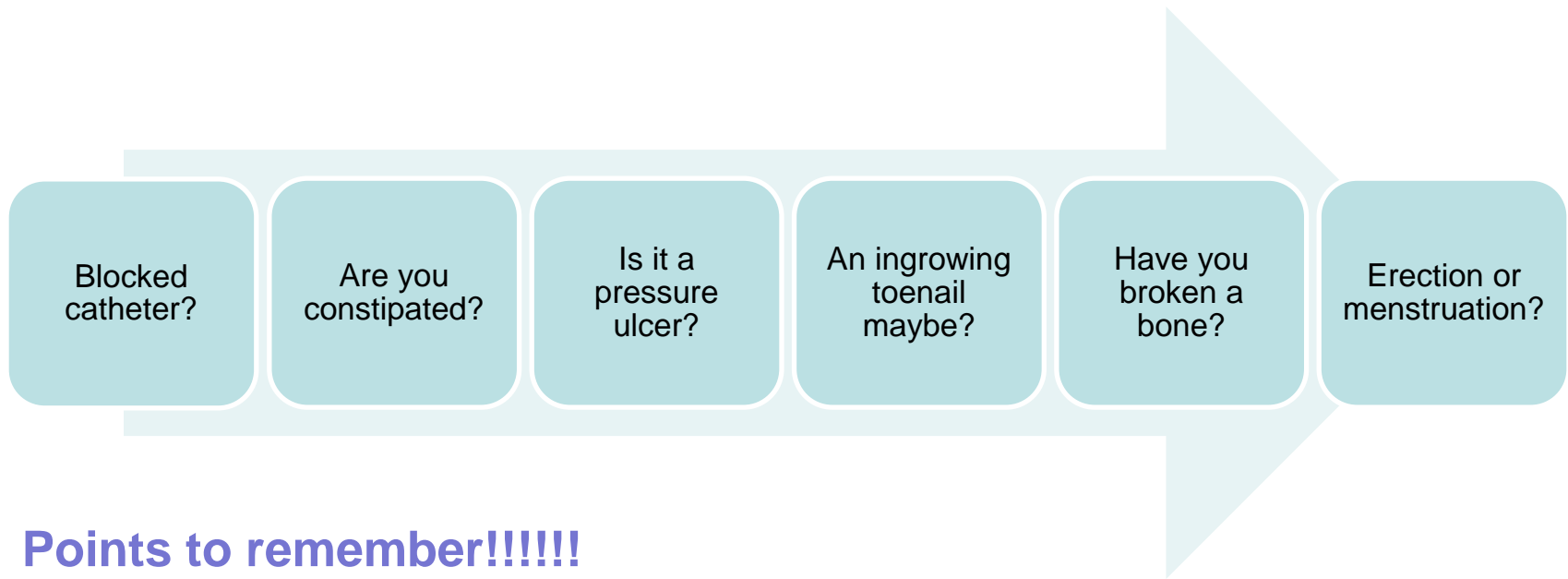
Treatment of Autonomic Dysreflexia (AD)

AD needs to be treated urgently because it can cause seizures, stroke or death.



Source: UAB Model Spinal Cord Injury Care System

Think... What is it this time? Act on it based on your patient education



Points to remember!!!!!!

- **A normal SCI BP is 90-110mmHg**
- **If the BP is not elevated, but you experience of the symptoms, it might not be a case of AD**
- **Nifedipine: Start with 10mg and repeat after 20mins if required. Maximum dose is 40mg in 24hrs**
- **Once the sign goes away, you have found the treatment!**

Spasm

- This is an exaggeration of normal reflex actions of movement.
- It can be increased by skin breakdown, bladder infection, kidney infection, painful stimulus below injury.
- It can be beneficial
(circulation, muscle mass, bone strength)
 - An increase of spasms could tell you there might be pain that you are unaware of.
 - Treat what is causing it and spasms will reduce again.
- Can be functional
(helping with transfers, walking, dressing etc.)
- Intervention by medication or surgery is possible if functional capacity is limited

Neuropathic pain

- The type of pain caused by damage to the nerves in the spinal cord
Abnormal nerve function into the spinal cord
- Neuropathic pain can occur at different sites:
 - Commonly it occurs around the borders where you have sensation, just **above or at the level** of your spinal cord injury.
 - It can also occur **below the level** of the spinal cord injury (even if you have no sensation)
 - *Pain is often described as pins and needles, numbness or burning.*
- Pain is a complex interaction between how your body feels, how much you feel able to cope and what you do.
- Understanding your pain is an important part of helping to reduce worry and stress.

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Hospital**

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