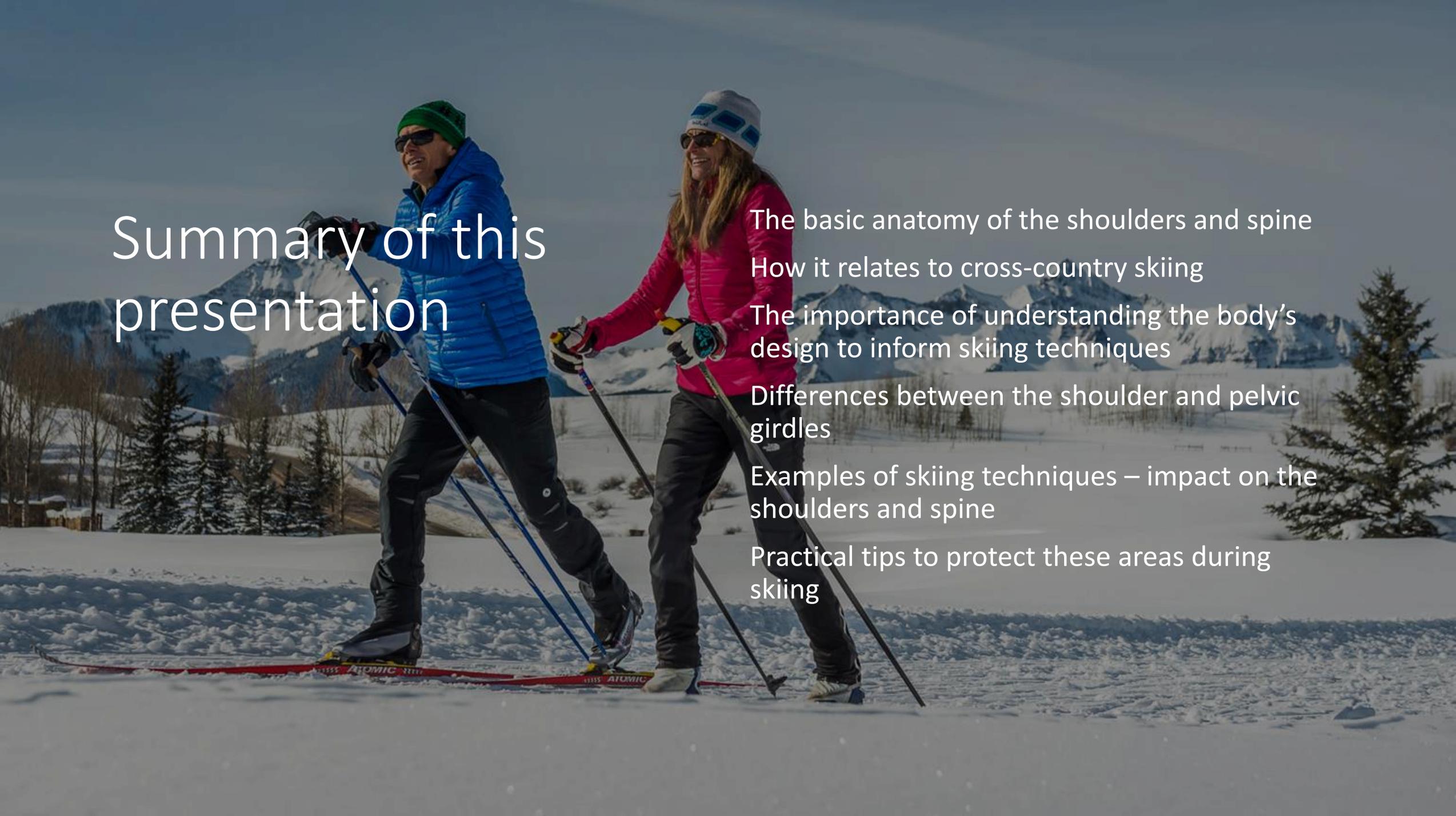


Backpain and Cross-Country Skiing: Shoulders & Spine



A photograph of two people cross-country skiing on a snowy slope. The person on the left is wearing a blue jacket and a green beanie, while the person on the right is wearing a pink jacket and a white beanie. They are both using ski poles and are in a dynamic skiing posture. The background features snow-covered mountains and evergreen trees under a clear sky.

Summary of this presentation

The basic anatomy of the shoulders and spine
How it relates to cross-country skiing

The importance of understanding the body's design to inform skiing techniques

Differences between the shoulder and pelvic girdles

Examples of skiing techniques – impact on the shoulders and spine

Practical tips to protect these areas during skiing



Why do we have backpains when skiing?

Back pain is a common experience for cross-country skiers, but proper technique can help us protect our spine and shoulders.

We are designed to move ourselves around mainly with legs, but in cross country skiing, we also use our arms to push with the poles.



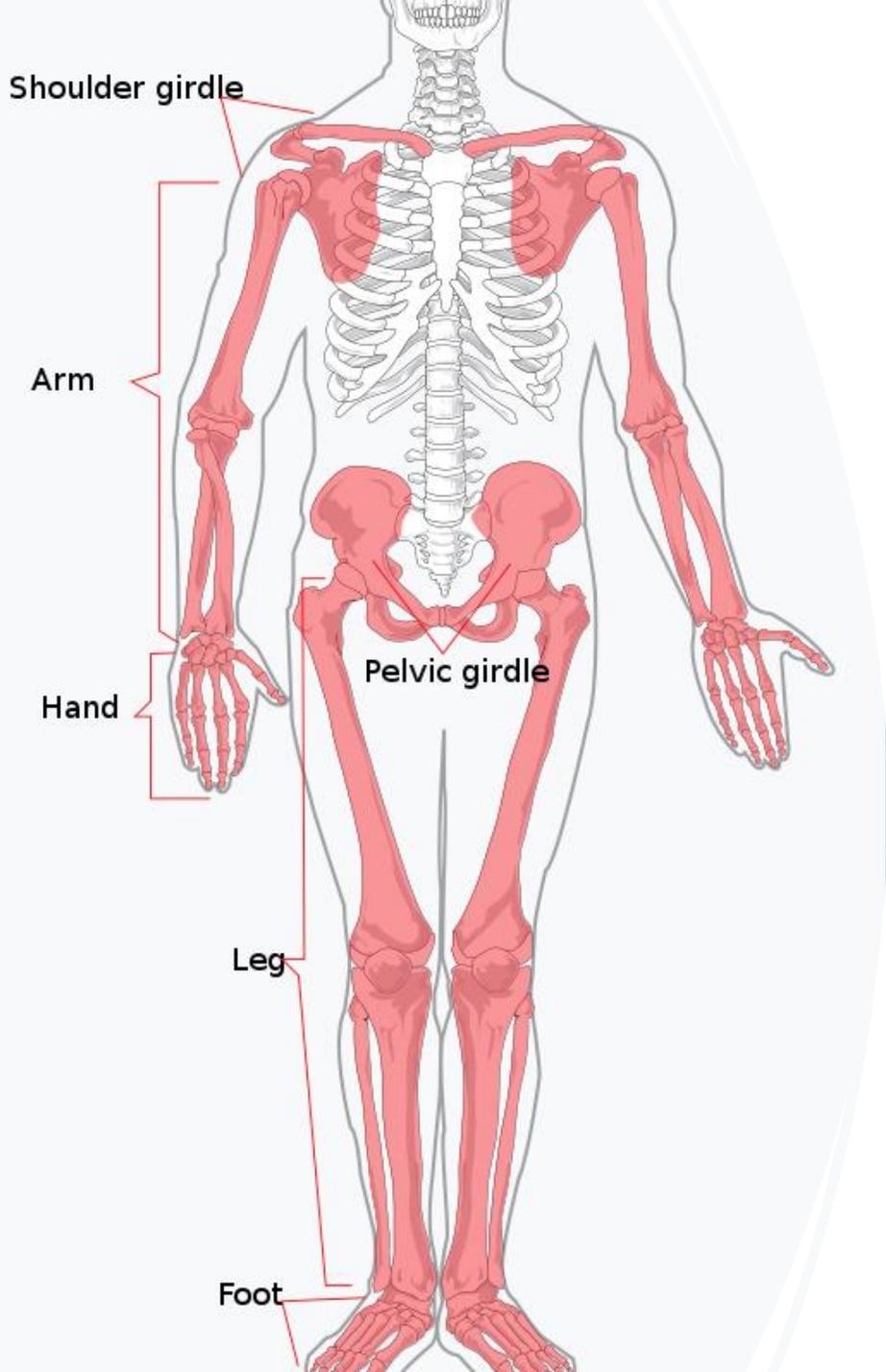
Key Point:

Our legs and arms are attached to our body for different purposes!



-> Think about how best to use our bodies in this sport.



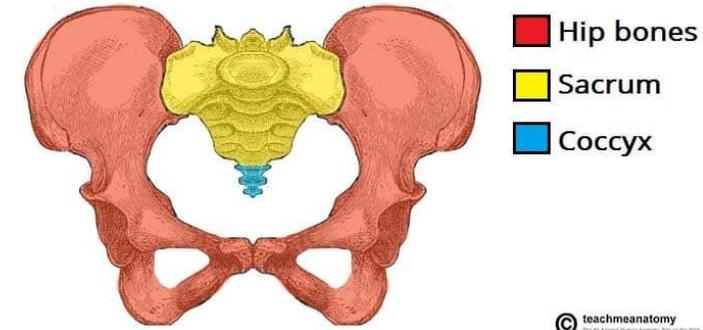
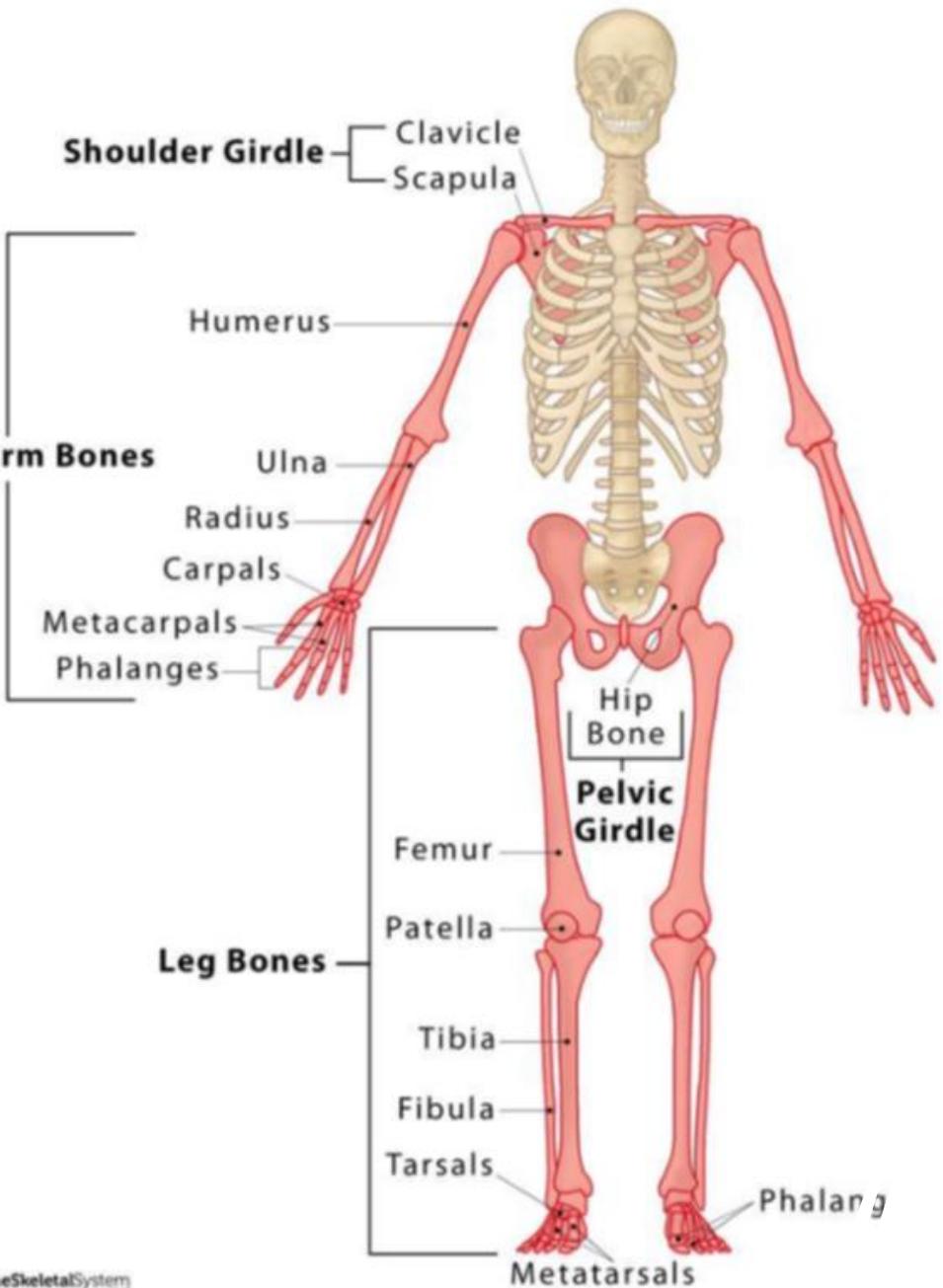


Girdles

- White – axial skeleton (central pillar)
- Red – appendicular skeleton

- Arms and the Legs are attached to the axial skeleton through girdles.

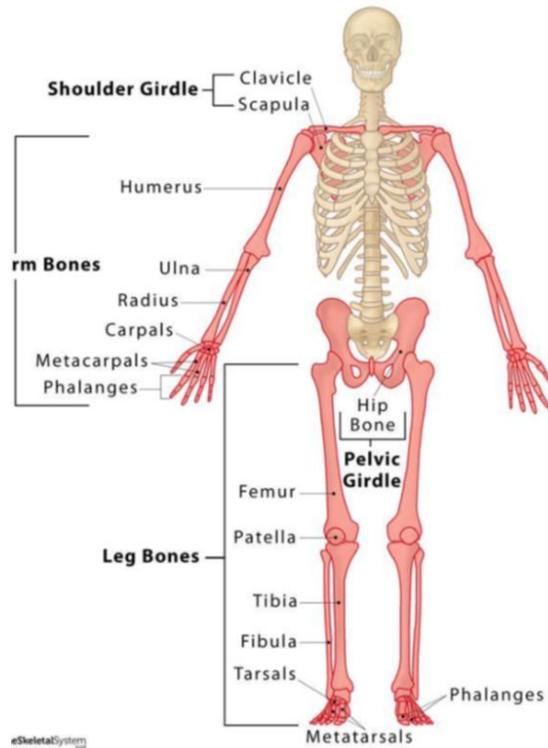
- 2 girdles: Shoulder girdle & Pelvic girdle



Pelvic Girdle

- Pelvic Girdle is attached to the axial skeleton at the base of the spine.
- The legs are attached at the pelvic girdle at the hip joint which is a very snug and secure connection.
- Pelvic Girdle provides a rugged and hard-wearing structure to support the body's weight and facilitate movement.

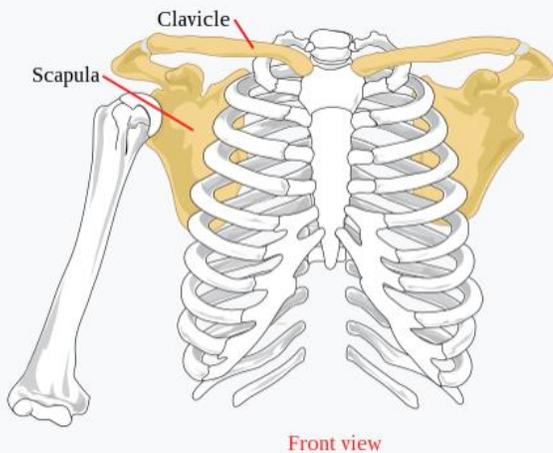
Appendicular Skeleton



Shoulder Girdle

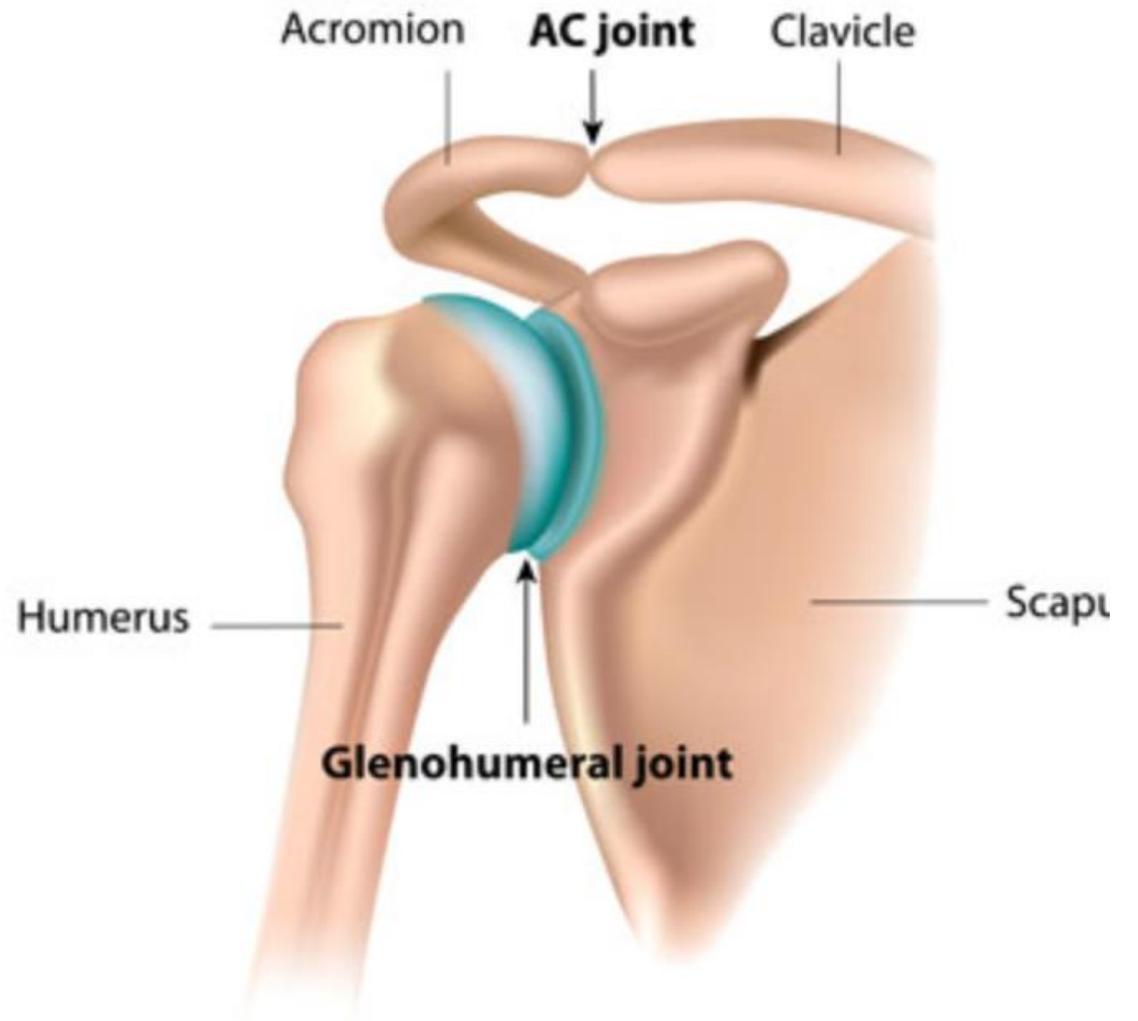
- The shoulder Girdle (pectoral girdle) is the set of bones in the appendicular skeleton which connects the arms to the axial skeleton.
- More finely constructed.
- Made out of collarbone (clavicle) at the front, and the shoulder blade (scapula) at the back.
- Bones are smaller and separate; not fused together like the pelvis.

Shoulder girdle



Shoulder Girdle – design of the body

- At the back of the body, the joint between the shoulder blades and the ribs is very loosely constructed, just made of soft tissue.
- The joint is also a ball and socket joint just like down in the hips; but this one is often described as being like a golf ball sitting on top of a T.
- Overall, the shoulder joint has a relatively more fine and delicate construction compared to the pelvis, because it is designed to accommodate a lot of movement and as we don't normally support the weight of our bodies with our arms.



Key Point:



Keep the shoulders down and relaxed to avoid putting a lot of pressure on the delicate shoulders!



Improper Technique

Demonstrates how improper shoulder movement during skiing can lead to poor posture and aggressive stress on delicate shoulder tissues.

Proper Technique

Illustrates the correct shoulder positioning and movement during skiing, emphasizing the importance of keeping the shoulders down and relaxed to avoid potential issues.



Forward Lean Explanation

- Forward lean refers to the positioning that we carry in most of our ski techniques where the body is angled forward.
- Usually, we are standing more upright in space, and when we think how gravity is affecting us, it is pretty much all compression on the spine.
- But, in cross country skiing, because we tilt ourselves forward, more of those gravitational forces change the direction of the way gravity is working across the tissue at the back, therefore we have a lot more shearing forces than we would if our body is upright.
- One thing we can do is to make sure we don't lean forward too much, the more the spine is angled forward, the more significant shearing forces will be.

Spinal Flexion and the health of the discs

- Spinal flexion is referring to any movement where you take the spine into a more rounded C-shape.

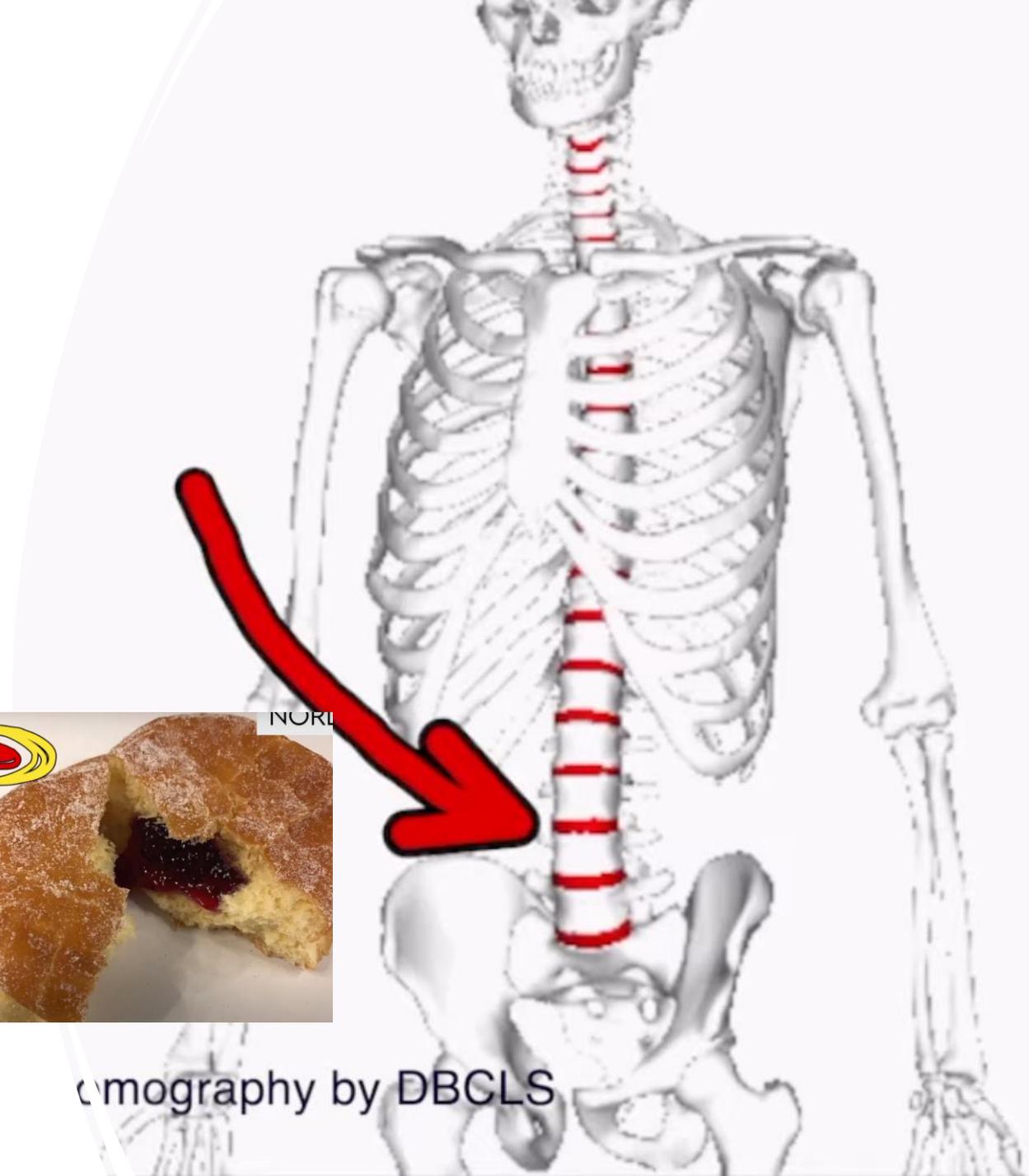


Features of the discs in the spine

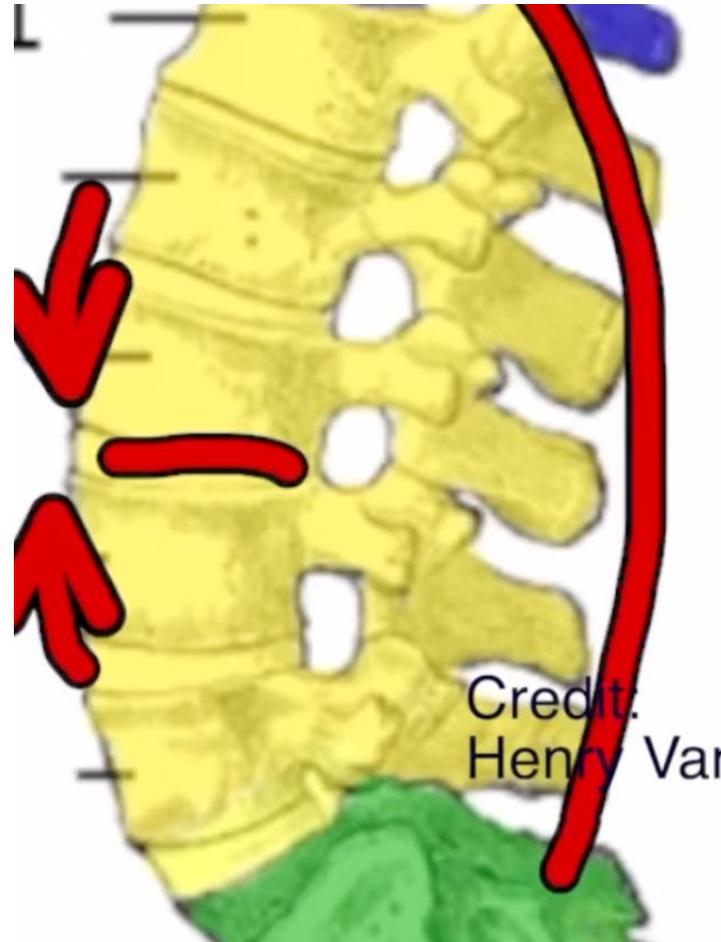
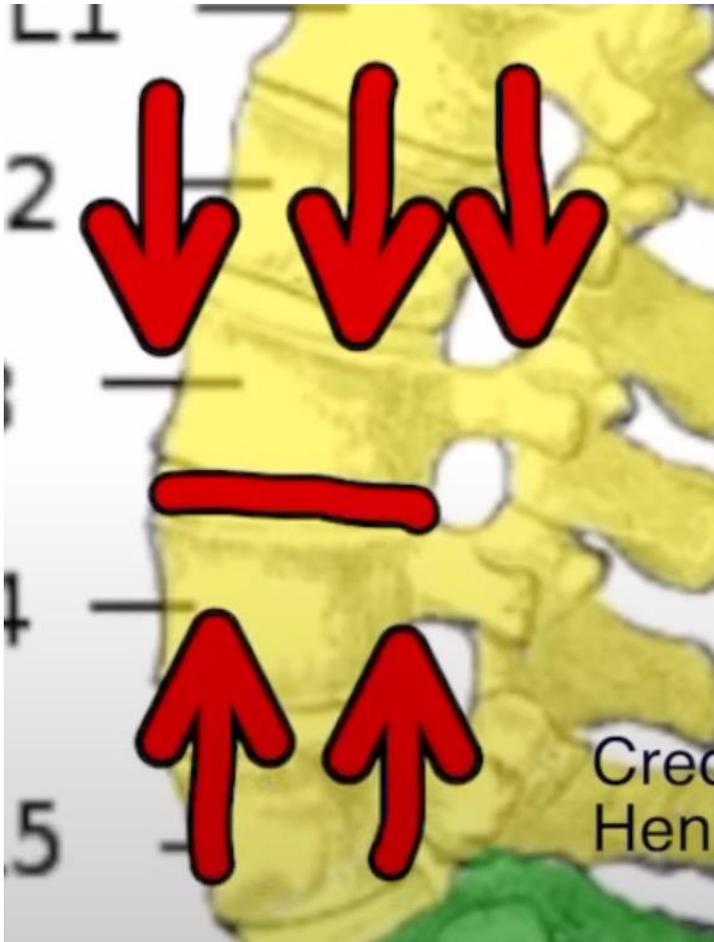
- Discs: soft cushion-like structures between the vertebrae in the spine along the back line; they help to provide some shock absorption.
- The outer layer is made of a firmer and more resilient structure
- The inside is a bit more fluid and pastier



Tomography by DBCLS



Impact on the discs during spinal flexion



- Normally, if we are upright, the pressure working across the discs are quite even across the surface.
- When we take our back into a C-curved shape, we are now starting to add a little bit more pressure along the front edges of the vertebrae.
- Thinking back to that donut, it is like you are squeezing together one side of the donut.

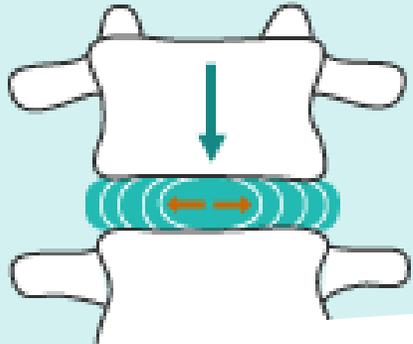


What happens to the disk?

- When we curve our back, the front side of the bones (vertebrae) presses together, and the discs in between them get squished. This is normal and not harmful. However, if we always bend our back in the same way, the discs can wear unevenly and get damaged. The soft material inside the discs can bulge out or even rupture, which can put pressure on the nerves and cause pain. To avoid this, it's important to move our back in all directions to keep the discs healthy and prevent any damage.

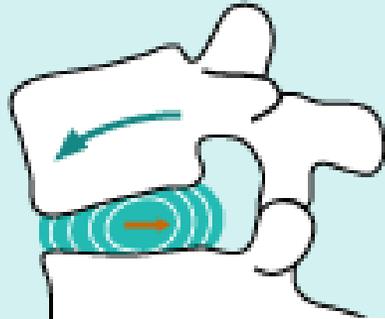
STANDING UPRIGHT

front view



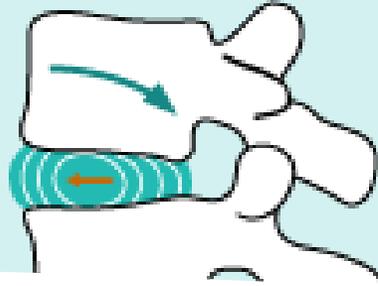
BENDING FORWARD

side view



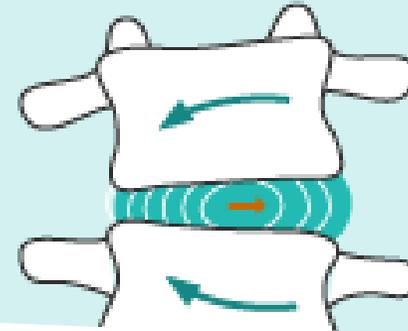
BENDING BACK

side view



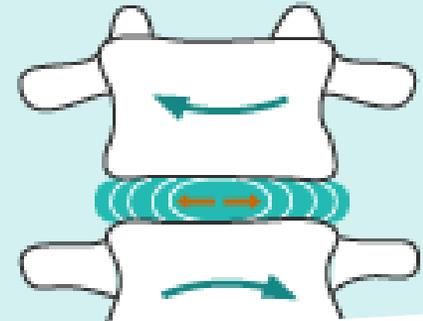
BENDING SIDeways

front view



TWISTING

front view



What happens
to the disk?

- 우리가 등을 굽힐 때, 척추의 앞면이 서로 눌리고 그 사이의 디스크가 압착됩니다. 이것은 정상적이며 해로운 것은 아닙니다. 그러나 항상 등을 같은 방향으로 굽히면 디스크가 균일하지 않게 마모되고 손상을 입을 수 있습니다. 디스크 안의 부드러운 물질이 튀어나오거나 심지어 파열될 수 있으며, 이는 신경에 압력을 가해 통증을 유발할 수 있습니다. 이를 피하기 위해 등을 모든 방향으로 움직이는 것이 중요하며 디스크를 건강하게 유지하고 손상을 방지하는 데 도움이 됩니다.

Practical tips to protect our spine



- Spinal Flexion (C-curved spine)
- Neutral alignment (natural S-curved spine)
- C-curved spine – **more** shearing forces on the spine.
- S-curved natural spine – **less** shearing forces on the spine.

Conclusion – the spine

It is not that the spine can't flex; spinal flexion is not bad or evil. The spine is designed to move; it is designed to flex, it is designed to back bend, it is designed to rotate and side bend. All of these are good and healthy things for your spine to do. It is just a matter of degree.

그러나 spinal flexion 을 완전히 고쳐야하는 것은 아닙니다. 왜냐하면 약간의 구부림은 치명적인 것이 아니라 자연스러운 움직임이 될 수 있으며, 기술을 할 때 필요하기 때문입니다.