- S shaped column is designed so that the weight is dissipated across the S shape
- The centre of gravity – goes just anterior or just posterior to the joint
- There is less degenerative change on the joint
- **Lumbosacral**
  - Weight transferred just anterior to the lumbosacral joint, then transferred lateral to hip joints, then falls anterior to knee joint and significantly more anterior to the ankle joint
  - Secondary cartilaginous IV joint (IVD is thicker on the anterior side and thinner on the posterior side – allows lordosis to take place )
    - Typical secondary cartilaginous joint; There is hyaline cartilage on both sides, and there is fibrocartilagious disc in the middle (IVD)
  - Synovial zygaphophyseal joints – between the articular facets; has superior and inferior articular facets; encircling of synovia membrane + capsule
- **Sacroiliac**
  - Sacroiliac synovial joint b/w *auricular surface of sacrum and ilium*
  - Strong weight-bearing joint
  - Synovial joint (but sometimes can be described as part synovial and part syndesmosis)
  - Syndesmosis – fibrous joint where two bones meet up at an interosseous membrane such as in the forearm between radius and ulna, and between tibia and fibula
  - The anterior bit is a synovial joint and the posterior bit is a syndesmosis
- **Pubic symphyseal**
  - Secondary cartilaginous b/w pubic bones (has a disc between them)
- **Sacrococcygeal**: b/w sacrum and coccyx – also secondary cartilaginous)

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**LUMBOSACRAL JOINTS**

- When you go from one region to another, there are typical characteristics of vertebrae in each region; but there are transitional vertebrae between regions
- In the lumbar region – the articular facets are in the sagittal plane
- When L5 meets with S1 – has transitional characteristics – mix of lumbar and sacral
- **L5 + S1**
  - Inferior articular fact of L5 – laterally and anteriorly oriented (oblique shape) in the coronal plane
  - S1 corresponds to L5 – postero-medially oriented
  - Thus able to flexion up to L5; at L5, the inferior facets lock the entire vertebral column relative to sacrum
- Don’t have anterior displacement of the entire vertebral column
- Important for upright posture
- Synovial

- Ligaments: ilio-lumbar ligaments on the top; from transverse process of L5 to the iliac crest
  - lumbosacral ligaments on the bottom: from transverse L5 to iliac fossa
  - stabilizing ligaments, and also strengthen

**SACROILIAC JOINT**

- sacrum meets with iliac part of pelvis
- there are two parts
- the anterior bit – auricular region of the iliac
- there is corresponding auricular region on sacrum (looks like an ear)
- the sacrum meets with the pelvis in the auricular region
- posterior to this, there is a sacral tuberosity
- there are two parts to the articular face
- the auricular surface has corresponding grooves + bumps – when sacrum meets with ilium, forms a closure; this part is the synovial part of joint (anteriorly)
- posterior part of the joint, at the sacral tuberosity – there is an interosseous membrane where sacrum meets ilium; this is the syndesmosis part of the joint
- important because when weight is transferred down, it goes anterior to L5/S1 joint; S1 has bony projection on anterior side called the sacral promontory
  - when weight is transferred, there is Tendency for sacrum to take weight and have a downward tilt into the pelvic cavity
  - The ligaments stop too much rotation happening in the sacrum
  - Thus sacroiliac joint is Important for weight bearing in an upright structure

**Ligaments for sacroiliac joint**

- Interoosseous ligament – most important
- Accessory ligaments – the ilo-lumar ligaments works as accessory ligament
  - Anterior and posterior sacroiliac ligaments – the interosseous ligament lies between this space between the sacrum and the ilium
  - Sacrotuberous + sacrospinous;
    - sacrotuberous – go from the sacrum to the ischial tuberosity
    - The sacrospinous ligaments also end up being accessory ligaments – to the ischial spine
  - Make the notches (greater and lesser sciatic notches) into foramina
  - They are accessory ligaments because
  - When you walk, there is compressive forces from the ground; in upright posture in bipedal human, ligaments take up a lot of the compressive forces that get transmitted upwards from the ground
  - When the compressive forces get transmitted upwards, there is tendency for the sacrum to rotate
  - The ligaments help keep sacrum in position

**MECHANISMS OF PELVIS**

- gravity falls at the L5/S1 joint
- The shape of pelvis relative to line of gravity is oblique
- The pubic symphysis ends up being the floor of the pelvic cavity, not the anterior wall
- Pelvic cavity is tilted when you are standing upright
- This means that the weight is transferred, the sacrum tends to turn/rotate into the pelvic cavity
- The rotation is centred at S2
- Inward tilting = nutation (nodding)
- When this happens, the sacrum and the sacral promontory falls inward
- When this happens, the pelvic inlet gets smaller; The pelvic outlet gets to be bigger