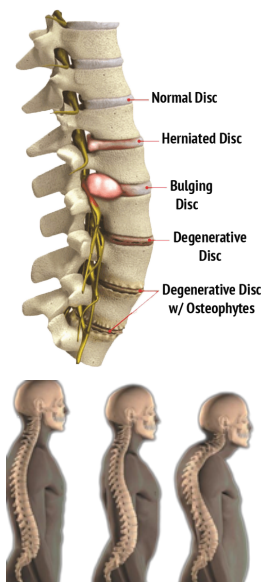
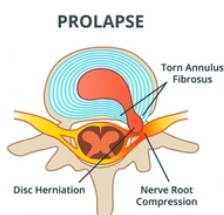
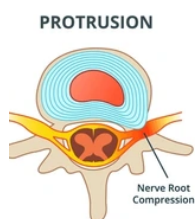
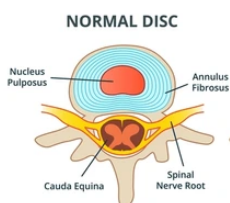


NORMAL AGE RELATED CHANGES IN THE SPINE

- MRI and CT scans are used extensively to assist the diagnosis of acute and chronic pain originating from the spine.
- This information assists in understanding what types of changes in the spine are considered “normal” with ageing and that the presence of these changes do not always result in debilitating symptoms or require medical or surgical treatment.
- As with the other joints in the body, with spine undergoes changes with increasing age. These changes include loss of disc height, disc bulges, osteophytes, enlarged facet joints and overgrown soft tissues.
- Degenerative changes can also affect the degree of curvature of the spine, such as increased thoracic kyphosis in the upper back or lumbar lordosis in the lower back.



- A scientific review (Brinjikji et al, 2015) examined the common findings on MRI and CT scan in 3,110 individuals of different ages. The results are displayed in the graph below.
- **NONE of these patients had any spinal symptoms.**
- The results showed that with increasing age, from 20 years old to 80 years old, normal degeneration in the spine is commonly and increasingly visible on a CT or MRI scan even in people who have no pain or other neurological symptoms.



Imaging Finding	Age (yr)						
	20	30	40	50	60	70	80
Disk degeneration	37%	52%	68%	80%	88%	93%	96%
Disk signal loss	17%	33%	54%	73%	86%	94%	97%
Disk height loss	24%	34%	45%	56%	67%	76%	84%
Disk bulge	30%	40%	50%	60%	69%	77%	84%
Disk protrusion	29%	31%	33%	36%	38%	40%	43%
Annular fissure	19%	20%	22%	23%	25%	27%	29%
Facet degeneration	4%	9%	18%	32%	50%	69%	83%
Spondylolisthesis	3%	5%	8%	14%	23%	35%	50%

For example:

- **Disc degeneration** was present in: 37% of people in their 20s, 80% of people in their 50s and 96% of people in their 80s but did NOT cause any symptoms.
- **Disc bulges** were present in: 30% of people in their 20s, 60% of people in their 50s and 84% of people in their 80s but did NOT cause any symptoms.

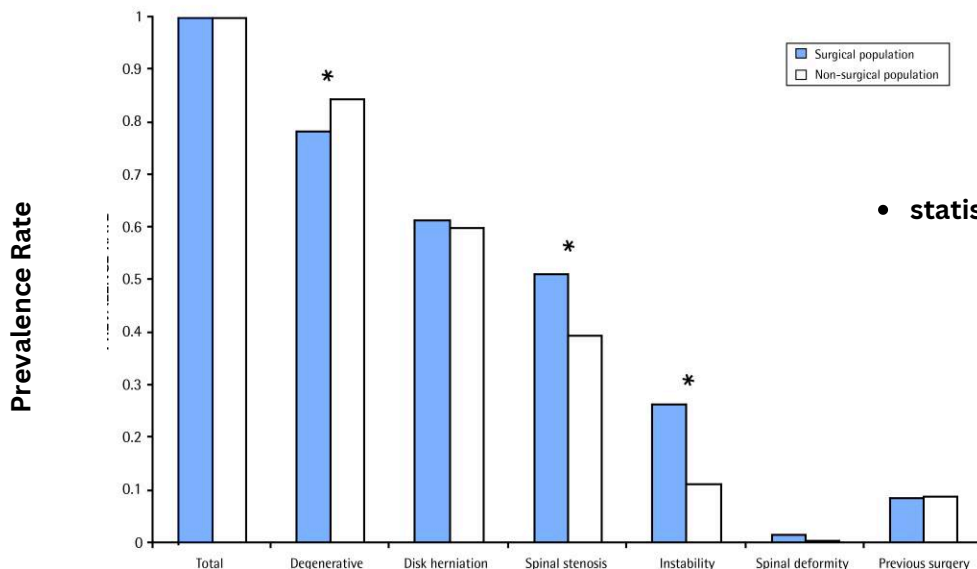
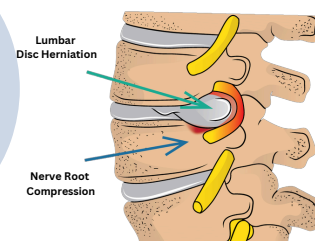
MRI FINDINGS IN PATIENTS NEEDING SURGERY

- In a study of 2,021 patients assessed by a spine surgeon in Canada (Cheng et al 2010), similar MRI changes were seen in patients who did (blue line) and did not (white line) require surgery.
- The results are in the graph below.
- Only patients whose MRI showed spinal instability or spinal stenosis /narrowing of the spinal cord were significantly more likely to require surgery.



Spinal canal stenosis

- In patients whose scans showed disc herniation, the number of patients who required surgery was not significantly different to the number of patients who did **not** require surgery.
- These results indicate that many patients had disc herniation visible on an MRI scan but only patients who had **severe neurological symptoms** from the disc herniation required surgery.



SUMMARY AND RELEVANCE

- Many degenerative changes visible on CT or MRI are a **normal** part of the ageing process, do not cause any significant symptoms and therefore do not require any treatment.
- CT and MRI scans are usually not helpful in the early stages of an episode of pain unless there are other neurological symptoms of concern such as severe nerve pain, weakness, altered sensation, paralysis or bladder or bowel problems.
- Imaging may be useful if patients have severe or debilitating symptoms that have not improved as expected over time or with treatment such as physiotherapy and pain medication.

THE ROLE OF SURGERY

Surgery is most useful in improving debilitating symptoms if:

- the changes on the patient's CT and/or MRI fit can explain the patient's symptoms AND
- the symptoms are severe and not improving with other treatment.