## Academy

### **Text Summary**

#### Orthopaedic Case Histories With Nick Birch

#### Nick Birch

- Second appearance for APM.
- Specialist Spinal Consultant at the Chris Moody Centre in Northampton.
  - A fantastic multi-disciplinary centre dealing with all sorts of orthopedic problems.
- Was a spinal surgeon but has retired from spinal surgery and now offers second opinions and conservative advice and other advice to patients.
- He is the specialist consultant for The Bone and Joint Journal.

#### Case Histories

- A 35-year old from Bangladesh- neck and lumbar spine pain
- Nick was asked to give a second opinion.
- A complicated situation with both neck pain and lumbar spine pain.
- The neck pain is associated with some right sided shoulder and soft arm pain.
  - Not really hard neurological symptoms.
  - Very persistent.
  - Not responded to what the patient considers to be conservative treatment.
    - Had physiotherapy but no real evidence that it has been carried out in a structural and logical way.
- Lumbar spine pain was much the same.
  - Plus, back pain and some leg symptoms into the buttock.
    - No real sciatica.
- No red flags for cauda equina.

#### Recommended treatment prior to seeing Nick:

- Discography- injections of discs to find out which ones are the problem and then to replace them.
  - Would not happen all in one go.
- The woman is in turmoil- only 31 and is also a mother.
- Difficult to determine what treatment has been given in Bangladesh.
  - Really well-detailed case history useful.
- If you pressurise a disc from the inside, the theory is that you stretch the capsular disc.

- The outer part of the annulus.
- It's only the outer six layers of the annulus that are actually innovated.
  - By pressurizing the disc, it should reproduce the pain that's coming from the disc.
- 20 years ago, this was *the* method to tell whether somebody had a painful disc and was the justification for a lot of surgery.
  - Later, it was realized that you can inject a disc that's not actually abnormal on the MRI scan and it might give you pain.
  - Then, a good paper from Los Angeles, published about 3 or 4 years ago, showed that if you do inject a disc that is normal on an MRI scan, you get quite rapid accelerated degeneration.
    - You can therefore make the situation worse 2 or 3 years down the line.
    - Now an outdated treatment in the West.

#### Any differences between medical standards?

- The people in Bangladesh are practically as good as their UK and German counterparts.
  - A lot of them train in the West now.
- Resources can be limited.
  - Because of that, there is a limit to what they can achieve but their standards are excellent.
- Problems arise when certain individuals have a particular idea about how they should investigate people.
- Idea of carrying out a number of disc replacements over time did not seem terribly sensible to Nick.
  - If you're going to operate on one part of the spine, you should concentrate on that.
  - In terms of the spine, it's the base of the pyramid that governs what happens to the rest of it.
    - If you get the lumbar spine right, quite frequently, the rest of the spine will settle down.
    - Best to pick the bit that was the most severe, be it the neck or the lumbar spine.
- Concentrate on getting that right by the least invasive mechanism possible.
  - If necessary, you can then go to a surgical procedure.

#### Alternative to Discography in the West

- Not just simply MRI but a combination:
  - A really good history, examination findings, the MRI scan.
    - The MRI scan is a picture of what you look like, not what you feel like.
    - Be very careful about interpreting changes on MRI scan actually that means something.
- There is also a scan called SPECT.
  - A combination of a brain scan with a CT scan.
  - Shows is the activity of osteoblasts, bone forming cells.
- Pretty convinced that that correlates much better with pain sources in the spine than with any other test we've ever come across.
- Not invasive in the way the discography is.

#### Provocative Tests

- If surgery is unnecessary, the relevant facet joints would be injected.
  - In the neck, the disc themselves are rarely the cause of mechanical neck pain.
  - They're the cause of radiating pain.
  - They're the cause of neurological symptoms.
  - They're the cause of myelopathy but not usually mechanical pain.
- The idea is to calm the pain down, creating a window of opportunity for the patient to undergo their rehab.
- If unsuccessful after two injections and subsequent treatment, you can carry out facet joint denervation.
  - This is effectively burning the nerves to prevent messages being carried to the brain, giving them a pain free state.
    - $-\,$  Most effectively done by getting down onto the pars and heating that area up to 90°C for 30 seconds.
    - Both the above and below joints need to be denerved as the nerve is coming up and coming down.

#### Compression tests and quadrant tests...?

• Used to be quite popular as they formed part of the tests that Waddell introduced to discover whether pain was psychological or real.

Since, we've become much more aware of the mechanisms of chronic pain.



#### Fat Suppression in MR Imaging

- Sequence of MRI
- You can use it to see whether an inflamed area is fluid or fat.
- Can be carried out after the standard sequence is complete and is manually started.

#### The lady's MRI

- There is signs of inflammation but little darkness on the T1 signal.
  - Could be an old or fatty change.
- These are called Modic changes.
  - Acute inflammation in the vertebrae, adjacent to the disc is inflammation.
- T2 is going to be bright whilst T1 is dark.
- Beyond that stage, you can get fatty replacement as it heals.

- By using the brightness of the vertebrae, it is possible to interpret whether something is acute or chronic.
  - As a disc degenerates, it becomes stiffer and eventually will stop hurting.
  - Sometimes, leaving something alone that is reasonably far down the degenerative pathway is useful as the natural history is benign for most of these conditions.
    - By treating conservatively, often you know that people will get better with only manageable episodes to worry about.
- Usually, there is little risk of herniation or prolapse to old, degenerated discs.
  - If the disc is fused, it will not cause any trouble.
- From interpretations of the MRI, it would appear that the lady has probably come across a surgical enthusiast. Somebody who is looking more at the scans than the patient.
  - Regardless, spinal pain only responds to surgery in a very small number of cases.

#### Advice to Patient

- Advised structural rehabilitation program to begin with.
- Prioritise the Lumbar Spine.
  - The bottom disc, L5-S1 disc, is really narrow and degenerate.
  - The L4-5 level above is only minimally dark (on MRI).
  - The rest of the spine looks OK.
  - There is an area of inflammation at the Thoracolumbar Junction, but no pain

#### present.

- Majority of pain is at the base, should that be relieved, the rest should fall
- Into place.
  No knowledge of final outcome, patients rarely seen again after second opinion.

#### Disc Degeneration Cause

- About 70% to 80% of the reasons why people have disc degeneration is genetically determined.
  - Only 25% to 30% is actually what you do in life.
- It is possible to get a lot of spine degeneration and no pain.
  - Conversely, the spine can appear normal and give you lots of pain.
- The SPECT is the closest thing to a pain scanner but doesn't yet achieve this feat.

#### Is there any racial component?

- Possibly greater in Caucasian as opposed to the Asian community- particular Nordics.
- Southern Europeans follow a different pattern.
  - Could be owed to a combination of both the genetics and also then the environment.
    - Their diet is somewhat different.
    - They take a siesta- they take pressure off their discs.
- The Asian population must be separated into Southern and the Pacific Rim.
  - e.g. The Far-Eastern community get a lot of ossification of the posterior longitudinal ligament.
    - They get degenerative change but in the neck, the myelopathy comes about from a different mechanism.
    - OPLL is like a sweeping bow, similar to Ankylosing Spondylitis

- Ask about family history of degenerative discs.
  - Often, a person's partner can notice problems within the family better.

#### Additional problems with degenerate discs

- As the disc degenerates, it leaks a number of unpleasant substances.
- Phospholipase A2 is a nasty enzyme that produces pain and you stick that on a nerve and it burns it effectively.
- Matrix Metalloproteinases can get on nerve roots and inflame them.

#### A 48 year-old male from Denmark- significant back and leg pain



- Patient had an MRI scan and was given an injection in China.
  - Doctor failed to tell the man that the injection would only last for a short period of
    - As a sidenote- managing patients' expectations in such circumstances is vital.
- Presented with back pain and had leg pain in a sciatic distribution.
  - He didn't have any neurological deficit.
  - He had an injection and a transforaminal epidural.
    - A needle to the outside of the foramen inject some dye, then put in some local anaesthetic and cortisone.
    - Worked to good effect initially.
    - Pain returned after around 6-8 weeks.
- Sought a second opinion for future treatment.

#### MR Imaging

time.

- At L4-5 and at L5-S1, there is darkness within the disc compared to the discs above which are normal.
- There is a bit more bulging at L4-5 on the left side than there is on the right side which results in left-sided pain.
- On an axial view, it is evident that the gentleman has fantastic paraspinal muscles.
  - However, there is a lot of light grey stuff stuck in he muscles which is actually fatty replacement.
- There is an annular tear in the outer part of the annular.
- Difficult to see a differentiation between the outer part of the disc which is the annulus and the central part which is the nucleus.

- The annular tear usually shines up as what's called a high intensity zone at the back of the disc.
- They represent an intermediate stage of disc generation.
  - Only relevant if somebody is suffering with radicular pain and doesn't have a bulging disc.
- Sometimes if there is no bulging disc and somebody has radicular pain, the cause can be chemical pain caused by the annular tear leaking substances onto the nerve root.
  - This can be found out by injecting as above, relieving pain temporarily.
- With effective anti-gravity treatment, this can allow the tear to heal up and can happen over a short period of time.
- Without the right treatment, it can go on for years.
  - A number of patients will experience a herniation but often the majority of those get better without surgery.

#### Advice

- With this case history, it was noticed that s pain only happens when he's upright and putting pressure through his back.
  - It's compression of the disc that causes the problem.
  - People like this can respond to inversion treatment.
    - This reverses gravity, takes pressure off the nerve and stops the irritation as well as leaky chemicals.

#### Inversion therapy

- Can be done with an inversion table.
- Perhaps has a 60/70% chance of benefitting somebody.
- There are no Random Controlled Trials- no level 1 or level 2 evidence.
- There's quite a bit of level 3 evidence.
  - Suggests that patients who have got a disc with some loss of its internal hydration, is collapsable and who've got reproducible back pain, when you load the disc, they can then, in certain circumstances, benefit from inversion therapy.
- Patients who have some sort of stenosis in the foramen benefit the most.

#### Inversion Table

- Includes clamps to hold the feet and a length controller for balance.
  - If you get the length wrong, it becomes difficult to self-invert.
- It will collapse in half, so is easily stored.
- Contraindications:
  - Those with significant eye problems e.g. glaucoma
  - Also not suitable for those with macular degeneration.
  - High blood pressure
    - As well as other cardiovascular imbalances.
    - Uncontrolled hypertension.
- The patient would begin inversion at 30 degrees.
  - Often, primary candidates will notice a slight shift in pain levels after a few minutes.
- Eventually, some people are happy to be inverted at 75/80 degrees.
- During inversion, the patient could begin to do core exercises.

#### http://teeter-online.co.uk/about-us/

- Prices can vary hugely depending on manufacturer from under £100 to just under £1000.
- (As a patient) Useful to find out whether a local therapist has an inversion table that you can use for a 10-minute trial session.
  - If there is a short-term benefit, investing in a cheap inversion table could be beneficial.

#### Dealing with Patients who see surgery as a quick fix

- Can be split into two aspects:
- If there is radiating pain (arm/leg), surgery can be the quick solution.
- If there is axial pain (neck and low-back pain), it is different.
- \*e.g. Terrible cervical brachialgia with pain going down the back of the hand, at the C7 distribution and there was wrist drop. There was a great big disc in the neck and it had all been going on for 3/4 weeks.
  - Surgery is the easy decision in this case.
- If over a six-week period, there are severe symptoms, you can talk through surgical options with the patient.
  - What's vital is the communication at this point.
    - Explanation of pros/cons of surgery
    - Risks/Complications.
    - Living with pain

Any injections, medication or subsequent treatments that are necessary.
 If they are 'scared' of surgery, reassure them.

- \*In the above case, the correlation is very good in the majority of cases.
- There are one or two caveats.
  - Firstly, if there is something pressing on a nerve and it presses hard enough and it turns the nerve off, you might not necessarily get the function back.
    - Surgery is never carried out just for things like numbness or a bit of weakness.
  - Secondly, you can have an unremitting and really severe nerve and yet the appearances on the scan do not suggest a huge disc hernia.
- 95% of people who have surgery for disc herniation and nerve compression will do well, 5% won't do well for a variety of reasons.
- If you could manage the pain the long-term, 95% of people would have satisfactory resolution anyway.
- Often, people take up the 'offer' of no surgery.
  - Normally not because of complications risks but because of benefits of nonoperative treatment.
- The NHS is now governed by targets whereby if you go and have treatment then you will have treatment at 18 weeks after referral irrespective of the urgency.
  - Therefore, time from presentation to treatment is something that does need reviewing for those occasions when surgery is needed.

#### Operations

#### Decompression

- Two fundamental reasons for a nerve root to be compressed:
  - Disc bulge pushing back into the nerve root.
  - The facet joint has become arthritic and has got osteophytes on it.
- If you have little disc bulge but a large arthritic facet joint:
  - The operation 'nibbles' away at the extra bit of bone that's pushing to free the nerve up, thus decompressing it.
- If you have a normal facet joint but a bulging disc:
  - The disc would be bulging backwards because there's a fragment of the disc that has come out of the nucleus and has then migrated into the spinal canal.
  - A micro-discectomy is performed to remove part of the disc and medially move the nerve.

#### Fusion

- Spinal fusion is essentially a mechanism to take away movement from the spine.
- This type of 'old-school' orthopaedics focused on pain disappearing after movement being prevented in an area.
- Used when discs are proven to be painful and mobile.
- Screws and rods fix the spine in place whilst a fracture is created in the spine.
  - Then, the key to the operation is a natural biological fix triggered by the body to make a strut of bone.
  - Therefore, the metal work is there as a temporary fix.
- An area of the spine is then immobilized and it is hoped that this removes pain from that area.

#### Allograft

- A form of bone grafting substance which can enhance the fusion process.
- Using donated dead bone, the femur is chopped up and stuck in a vat of acid.
  - After being left for a few weeks, the calcium gets leached out and left is collagen and non-collagenous proteins.
    - These proteins can actually make bones heal.

#### Incidences of complications post-surgery

- Well-trained surgeons with the right intentions should perform well.
- The risk of single nerve root damage is 1% but of this 1%, the majority get better.
- Bruising may be present but that will get better.
- The area of potential danger is the C5 nerve root.
  - Located in the middle of the cervical lordosis, it is the nerve root that is most under tension.
  - If pressure is removed it can 'bowstring' backwards and you can get a C5 Palsy.
     Often irreversible.
- Paralysis is a risk in the cervical spine but the chances are no higher than about 1 in 2000.
- Neurological complications are rare but they are catastrophic.
  - The patient needs to understand but not fear having something they need done.

- Often occur when neurological pain is mistaken for mechanical pain, whereby somebody has chronic centrally sensitized pain.
- The multi-disciplinary team at the Chris Moody Centre have been able to create a set of signs and presentations to distinguish between the two groups.
- Essentially, if there is a complication that's got a risk of less than 1 in 1000 should you tell the patient.

#### Case History 3: Paraglider



- Taking part in a race in the US, this gentleman effectively crashed into Mount Shasta.
- He got this burst fracture of his L3.
  - The spinal canal is quite big at that stage and you've only got a few nerve roots left.
  - You can get quite a lot of damage damage and quite a lot of compression.
- If it was further up at the T10, he would be in a wheelchair.
- Operation went through the tummy and removed the whole of L3.
  - Advantage of operation through the front was that you do not disrupt the muscles on the back.
- The bone was replaced by mesh which was used as a bone graft.
  - Allows the bone to from one vertebra down through to the next and so there is a solid strut of bone.

#### Case History 4: 'Flying Car Video' (1 hour 20 minutes into the recording)

- Similar to the previous gentleman, this man had crashed numerous times, breaking both angles after a crash.
- Treated in the September of last year and saw Nick in the October.
  - A month's rest.
  - Estimated recovery time of 4-5 months to heal.
- 6 weeks later, after another x-ray, the gentleman asked whether he could fly to Phoenix to compete once again.
  - Obviously, this was advised as a bad idea but the patient ignored it.
- By the next follow-up in February, nothing had deteriorated despite him competing.

#### Anti-Inflammatories.

- Function by reducing inflammation through the arachidonic acid pathway.
- If somebody has inflammation, an anti-inflammatory is necessary.
- The best thought-of anti-inflammatory currently, is Naproxen.
  - Recommended intake of 500mg twice daily for an adult and half of that for a child.
- Advantageous as it can deal with something that's primary inflammatory which is a disc hernia.
  - Conversely, they are no good if there is just got a disc that's been pressed on by an osteophyte because there's not an inflammatory reaction there.
- The main negative of anti-inflammatories is their side effects.
  - Cardiac side-effects- implicated in sudden-death cardiac events.
    - This caused a trend of trying to avoid using them but trends swing back eventually.
    - By using anti-inflammatories intermittently with a time-period break inbetween usage, the side-effects appear to be mitigated.

# First Draft