

# Medi-Vision™ Film Transcript

## Programme 11

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### ORTHOPAEDICS 3: Examination of the Knees and Ankles

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*Introduced by*  
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#### Introduction

DCA Today Mr David Marsh, Senior Lecturer in Orthopaedic Surgery at the University of Manchester and Consultant Orthopaedic Surgeon at Hope Hospital, is going to demonstrate the examination of the knee, ankle and subtalar joints on three different patients with three very different problems.

DM There are **two main groups of patients** who require examination of their knees. One is the older patient with **arthritis in the knee** - either degenerative or inflammatory arthritis. And the other is the group of younger people, often quite athletic people, who complain of **instability in their knees** primarily, and pain associated with that, it's often associated with an injury.

In this video I'm going to demonstrate how to examine a knee on a patient of the second category and then we'll have a look at an older patient with arthritis.

#### Patient 1

David is a manual worker in a bakery who had a football injury eight years ago to his left knee where he got a kick.

He had an arthroscopy at the time that didn't show anything specific torn, just some wear and tear. But ever since then he has continued to have troubles.

DM What's been the main symptom that you've had in the last six months or so David?

Patient Pain inside of the knee and the back of the knee.

But the thing that concerns me is that every now and again the knee just gives and that seems to jar everything else really.

And although I've been on anti-inflammatory tablets, that seems to kill bad effects we are back to square one.

DM Does your knee swell?

Pt If I don't take the tablets yes it does.

DM Right. Has the knee ever jammed in one position, locked up on you?

Pt Not that I couldn't get out of.

Although I find if I banged the knee... if I put weight on my knee it seems to jar.

If I pull my knee up again and straighten it that seems to cure it.

#### Examination

DM *Right. I'd like to just see how you are able to move your knee now.*

*Can you stand with your side to the camera, and push your feet together and push your knees back as far as you can.*

That's the best way of demonstrating that the patient doesn't have any loss of extension range.

- DM *Can you now squat down on your haunches?*  
 And that's the best way of demonstrating that he doesn't have any loss of flexion.  
 That's the active range of movements we've tested.  
*That's fine, can you stand up now please and face the camera?*  
*And just stand there in an easy posture.*  
 One very important thing to look at with the knee which we will see more particularly with the second case is the alignment of the joint, and David has normal alignment.  
 If you follow your eye from the tibia and then along the shaft of the femur you will see that there is a slight physiological degree of valgus.
- DM *All right. Would you like to lie on the couch now please David.*  
 Before we carry through the examination, let's just **revise the surface markings** of the knee joint.  
 If we start with the knee cap... easy enough to feel... and then get the top of the tibia marked out... tibial plateau... you can also feel just to the side of the patella the femoral condyle - the lateral femoral condyle - which comes round like that... and the medial femoral condyle which comes round like that...  
 Between the patella and the tibial tubercle we've got the patellar tendon.  
*Just put your leg down there...*  
 And above the patella and further above it than you often realise is the synovial cavity which is a sort of a horseshoe shape... round like that.  
 And if there is an effusion in the joint then it will distend that horseshoe shape.  
 So that one of the important distinctions to make when you see a swollen knee is between the horseshoe shape of an effusion or a haemarthrosis in a joint, and a prepatellar swelling such as you'd get with a prepatellar bursa.
- The other structure that we need to mark in is the **ligaments of the knee** which we will be testing shortly.  
 And the lateral collateral ligament ends on the head of the fibula which is here... and runs up to the lateral femoral condyle and is a rope-like structure - cylindrical.  
 Whereas the medial collateral ligament which connects the medial side of the femur and tibia is more shaped like a strap.  
 The cruciate ligaments of course are in the middle of the joint, running in the sagittal plane, crossing each other like that... .
- Having revised the surface anatomy, let's now examine the knee starting with the **quadriceps muscle**.  
 Almost anything that goes wrong with the knee leads to quads wasting, and it is an important diagnostic sign as well as being an important matter of treatment to prevent quads wasting from becoming established.  
*Can you brace your quads muscles... your thighs please David?*
- DM David doesn't have any significant quads wasting.  
*Just relax now.*  
 If you want to be exact about it, you can make a circumferential measurement of the quads on each side, but if you do that you must remember that the thigh is a conical structure and you need to standardise the height above the patella in which you make the measurement.  
 So before making the measurement circumferentially mark a distance above the upper pole of the patella in pen on the thigh... and do the same on both sides so that you get comparable measurements.
- Having looked for quads wasting, the next sort of shape aspect to look at is **the presence or absence of an effusion**.  
 An effusion as we've said tends to be horseshoe-shaped but it can be very small or it can be very tense and large.  
 If you have a large tense effusion then the best way to detect it is with the so-called patella tap... where you push the patella up and down and it will be floating off the femoral condyle if there is a significant effusion there, but it will be possible to bounce it down and you will get a balotting clicking sort of feeling known as the patellar tap.

For smaller effusions you use a different technique which is to try to sweep the fluid round from medial to lateral sides and to watch it moving.  
So the best thing to do is to empty the lateral side of the joint by compressing the suprapatellar pouch of synovium there... and then to flush any fluid back again, and to watch as it runs down here... , and if there is a small effusion even as little as an egg cup full of fluid, we will just lift a little wave of skin as it runs down there... .  
But David's joint at the moment is perfectly dry.

Now let's move on to **test these ligaments** that we've marked out.

The basic principle is that you **examine the normal side first** and then compare the abnormal side.

The collateral ligaments are tested by applying the appropriate stress to see if they are stable and under normal tension.

To test the medial collateral ligament you apply a valgus stress, to test the lateral collateral ligament you apply a varus stress.

There is a trap however, and that is that the cruciate ligaments, when the knee is fully extended are tight, and they function as a sort of a middle collateral ligament which can give you spurious stability.

So the thing to do is to take off that tension by just flexing the knee 10 or 15 degrees, and then apply your valgus stress... and your varus stress... on the normal side, repeat it on the abnormal side.

The lateral collateral ligament there... is stable and has normal tension, but the medial collateral ligament does open out slightly...

DM When we come to test the cruciate ligaments we need to be pulling the tibia in relation to the femur in the sagittal plane.

The best way to do this is to flex the knee... and to pull the tibia forwards and backwards.

But there's another trap here, and that is if the posterior cruciate ligament is damaged then the tibia may already be sagged back.

And when you pull it forward you reduce it to the normal position.

Because you've moved it an abnormal extent in a forward direction you make the wrong deduction, which is that the anterior cruciate ligament is damaged when in fact it is the posterior.

So before applying sagittal stress it is important to put the knees up together and to look at the two tibial tubercles and check that there is no posterior sag of either knee before you start.

Having done that, you then apply an anterior draw by relaxing the hamstring tendons and pulling the top end of the tibia forwards... .

That's very stable, no movement at all in the sagittal plane, and on this side... *just let your hamstrings relax, I won't let the knee fall...* this one comes forward appreciably more.

A definite sign of anterior cruciate laxity.

Having looked at the ligaments, the next structure that we are interested in is **the menisci**.

The sort of injury that David described in a football game is typical of the mechanism of production of meniscal tears - particularly twisting injuries.

And some aspects of his story were quite typical of a meniscal tear.

The way to think about the menisci is to look at the joint line.

They lie on the joint line.

And in this window... between the femoral condyle and the patellar tendon and the top of the tibia, there is a window into the joint where you can feel the edge of the lateral meniscus there... and the medial meniscus here.

*Is it tender at all when I press you there... or there...?*

Slight tenderness there.

*If I come round the back and poke at... that is sore is it... and in there...?*

There is a suggestion of tenderness around the lateral meniscus.

Another test you can do for meniscal pathology is the so-called **McMurray's test**, where you place your fingers on the joint to feel any vibrations or clunkings that you produce... and then very gently you flex the knee up and rotate the tibia in the flex position... and having rotated it then you extend it.

Nothing abnormal felt on that occasion.

Rotate it the other way... again nothing felt.

Sometimes there's a definite jumping of the joint as the femoral condyle relocates over a meniscal tear, and that's a very hard sign of a meniscal tear.

DM Finally, having thought about the ligaments, the presence of an effusion, and the menisci, the remaining structure to think about is the **patella**.  
Or to be more precise, the patello-femoral joint which can give rise to a lot of pain usually felt anteriorly and often giving rise to a history of locking - although it isn't usually true locking. It doesn't jam up like when the meniscus displaces, but it's so painful to move that the knee really freezes up and the patient will often describe it as locking.

The best test for patellar pathology is to compress the patella against the front of the femur and ask the patient if it reproduces the sort of pain that he's complaining about.  
*Is that the sort of pain that you get, or is it a different discomfort?*

Pt It is a different type of discomfort.

DM *Good. Can you brace the quads muscle? ... relax...*  
I'm pressing now on the upper pole of the patella.  
*Brace it again...*

That is often quite uncomfortable, *but that again is a different discomfort is it?*

Pt Yes it's more of a sort of bone discomfort.

DM Yes, *okay*. So patella symptoms, patella discomfort is not what he is complaining of.

For completeness, one should also with the patella do what's called a patella apprehension test which is important in people who have a history of subluxing patella.

Which is to push the patella laterally... and medially... and if somebody has previously had a subluxation or a dislocation of the patella, that will make them very apprehensive - they will have a feeling that it's about to happen again.

That in him... is negative.

So in this particular knee we have no effusion, no particular quads wasting, but a suggestion of ligamentous laxity and a suggestion of tenderness around the lateral joint line.

And the next step with David is an arthroscopy which he is going to have this afternoon.

## Patient 2

### History

DM The history given by our second patient is quite different from that which David gave. Her chief complaint is not so much of instability, but of pain in the knee due to arthritis.

DM Mrs M

MM Yes?

DM How much pain are you getting from your knees? And is it disturbing your sleep?

MM If I'm in bed I'm alright. But sometimes I get cramps in bed.

DM Yes.

MM It pains me the most here.

DM But if you are off the knee then it doesn't hurt. How far can you walk before the pain stops you?

MM Sometimes it stops me when I walk for 10 minutes... sometimes 20 minutes.

DM Can you get out and do the shopping?

MM I don't do the shopping, the children do the shopping.

DM Really! Do you get out of the house at all?

MM A very little.

DM A little. And is it the knee which is the limiting factor which holds you back?

MM Of course the knee... I couldn't go to the shops, I couldn't go nowhere.

DM Right. Do you walk with a stick?

MM Yes.

DM Just one stick?

MM One stick, I've had it already for five years. Professor Galasko told me I should carry a stick.

DM Yes. And what do you take in the way of painkillers?

MM Sometimes the painkillers are alright and sometimes they do nothing for me.

DM How many do you take each day?

MM I take between two and six... up to six.

DM And what are they?

MM I don't know what it says.  
 DM Right, okay.  
 And I believe you had a hip replacement on the left side and that is satisfactory is it?  
 MM Yes.  
 DM The right hip is okay?  
 MM I don't know.  
 DM It's not hurting is it?  
 MM No.  
 DM And the left knee is not hurting?  
 MM No.  
 DM So it's just the right knee we need to look at.

### Patient 2: Examination

DM ... just stop there.  
 You can see that the alignment of the right knee is grossly abnormal.  
 On the left she's perhaps not quite got the normal valgus angle of seven degrees between the tibia and the femur but it's not far out.  
 On the right she's distinctly **bow-legged with a varus deformity at the knee**, and you can imagine that the mechanical forces will be abnormally concentrated on the medial half of the knee joint.

**The x-rays** confirm what we saw clinically.

These are **long films taken with the patient standing**.

You can see that neither knee has a normal alignment, but on the left we are much closer to the normal arrangement whereby there is seven degrees of valgus between the tibia and the femoral shaft.

On the right side where she is complaining, she has an actual varus deformity at the knee joint, giving a knock-knee appearance.

And **all force is being transmitted through the medial half of the joint where the changes of osteoarthritis are very apparent**.

She has **subchondral sclerosis** of the bone, an **absence of joint space**, and **marginal osteophytes** - the classic signs of osteoarthritis.

**The importance of having a standing film** is shown from this x-ray that was actually taken more recently but with the patient lying down.

Now it appears there is a joint space, but we know from the standing film that this is not true, and in fact there is no cartilage left in that medial half of the joint at all.

### Patient 3

#### History

DM Now we are going to look at a patient who has difficulty walking due to **stiffness in the ankle joint and subtalar joint** in the hind foot.  
 Pauline had a fracture of her left tibia three years ago, and following that she had another fracture of the left ankle.  
 The result was that she spent a long time in plaster which immobilised her ankle and foot.  
 DM What trouble do you get with your walking now Pauline?  
 What do you notice most?  
 P Well the point is if I'm going anywhere on an incline, or going downstairs, not as much as coming up stairs, actually going down you can't walk forwards, you have to walk step by step down the stairs.  
 And anything that's slightly uneven which throws you, or a chair which is offset it catches the beginning of my walk and throws me that way, I'm constantly tripping really with it.  
 DM Is that because the foot is painful or because it feels stiff?  
 P Well the stiffness, but also the pain is there after you've walked maybe 20 minutes, quarter of an hour.  
 First thing at morning after you've put your feet out of bed - that's traumatic for mornings.  
 Another morning it can be quite bearable.  
 DM So where do you feel the pain when you get it?  
 P Mainly in the round part of the ankle down on this part there.  
 DM Right. Okay let's see how you walk now.

### Patient 3: Examination

DM As she walks you can see that the **whole of the left lower limb is externally rotated**, not only is the foot pointing out, but the knee is as well.

Let's examine her ankle and subtalar joints now and see why she needs to walk like that.

The two joints that we want to examine here are the **ankle joint itself and the subtalar joint** in the hind foot.

The ankle joint is more or less a hinge joint and it moves into plantar flexion and dorsiflexion.

Pauline's left foot is the abnormal one, so if we look at the normal... *can you pull your foot right back for me?...*

that is approximately a normal range of dorsiflexion - 20 degrees or so.

*Bring the left one up to join it...*

You can see it doesn't anywhere near make it... it lacks about 30 degrees of the normal dorsiflexion range.

And more importantly if you look at it a little bit more obliquely... it doesn't come up to neutral. If she was standing with her tibia vertical, her heel wouldn't be taking her full weight on the floor.

She's in slight equinus the whole time.

And that's the reason for the effect on her gait that we saw.

The **subtalar joint is harder to examine...** you have to **grasp the os calcis** which is below the subtalar joint **and the tibia** which is above it... through which you have a grip of the talis... and move the os calcis in relation to the talus in the **action of inversion and eversion.**

DM And that is the normal range, it's hard to put a number of degrees on it and it varies between people; so it is really essential to **examine the normal side first** and get a mental picture of how much the normal range is for this person.

Having done that, if you move to the other side, and in Pauline's case there isn't much doubt because it doesn't move at all.

Just the faintest little jog of movement... it's mainly soft tissue that is moving, the os calcis is barely moving at all in relation to the talis.

**And stiffness like that of the subtalar joint is a very common result of tibial fractures and ankle fractures where the ankle and foot are immobilised in a plaster cast.**

Now the reason for Pauline's external rotation of the foot when she walks, is that because she can't get her heel to the ground as on the normal side when she leans forward, she has to try to make her way by externally rotating... so that she can come through this way... and roll onto her instep.

That's the only way that she can walk without a tremendous limp.

### Summary

DM

- These three cases demonstrate the importance of a precise technique for examining the various parts of the lower limb.
- Pauline for example, shows how important it is to examine the ankle and subtalar joints when trying to understand why somebody's gait is disturbed, and why their limb is perhaps rotated in an abnormal way.
- The first patient - the young man with the knee problem - demonstrates the importance of an exact technique for examining the ligaments, so as not to be fooled into making a false diagnosis.
- And the older lady with the arthritic knee showed the importance of assessing the biomechanical alignment of the lower limb with the patient in a standing functional weight-bearing position, in order to understand really the reasons for her pain.

