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Listening to your knees

Posted on Tuesday 13th September 2011

A consultant orthopaedic surgeon at West Cumberland Hospital is pioneering a dynamic form of clinical testing of the knees which could help spot early signs of osteoarthritis.

Mr Suresh Rao believes that the key to detecting osteoarthritis may lie in the noise that knees make. A team led by the universities of Lancaster and the University of Central Lancashire have found that a technique called acoustic emission signalling – routinely used in the engineering industry to detect unsafe buildings and bridges and to investigate aircraft crashes – can also be used to pick up early joint degeneration.

The acoustic emissions technology 'listens', measures and analyses high frequency sounds released within knee joints during movement. Sound waves made by the knees of healthy people are different to those with osteoarthritis of the knee. The signals are then transferred to a computer where a clear diagnosis can be made and a treatment plan can be put together which could include lifestyle management, exercise programmes or medication.

The piece of testing equipment is small and portable. It could be used by GPs and hospital doctors and nurses to both initially screen a patient and to regularly monitor patients with knee osteoarthritis to see whether the knee is changing or responding to treatment. It is hoped it could reduce the need for MRI scans or other expensive, less accessible techniques. Mr Rao plans to conduct a pilot study for clinical testing at West Cumberland Hospital by April 2012, using the acoustic emission device.

Mr Rao says: "The test is a very dynamic way to screen patients. It carries out a movement analysis, scanning knees for the tell-tale sounds as the patient stands up and sits down – this is a notable difference from an X-ray or MRI scan. These traditional tests create the need to come to hospital or to a diagnostic centre, making them less cost-effective than the audio emissions technology. When fully developed, the new technology will be a cheap, versatile and portable tool for GPs to use in their surgeries as a screening test to detect the early signs of osteoarthritis, which is a key issue. The burden to the community is likely to worsen with ageing populations and there is currently no cure for osteoarthritis, but it can be managed better if it is picked up early. This could allow patients to make important lifestyle changes which could significantly improve the condition of their knees and may avoid surgery in the future."

Mr Rao sees great potential in the technology and has hopes for the capability of it in the future as it is further developed. He says: "The plan is to be able to use the audio emissions technology whilst a patient is swimming or on a treadmill in order to determine what the best exercise plan is for the individual. Poor compliance due to lack of motivation is a serious issue with all forms of exercise regimes, but this device may be able to offer positive feedback to the individuals so they may feel encouraged to continue to exercise. Furthermore, the device may help an orthopaedic surgeon in deciding when surgery is appropriate or even to test outcomes following joint replacement surgery."

The Great Cumbrian Joint Walk, which took place in Whitehaven on Saturday 3 September, has helped to raise funds for the Orthopaedic Research Fund and support studies using acoustic emission technology



Mr Rao

