Patient Reported and Patient Centred Outcome Measures: How do you measure pain and quality of life?

Pain; ‘on a scale of one to ten, please tell me how much pain you are in’...

Ask five different people who have the same disease for the same length of time and you will get very different answers. This is due to a whole host of varying factors which include:

• differing tolerance levels to pain from patient to patient
• the disease may affect the quality of life of patients in different ways depending on what their priority is; ie one person may ‘live’ to play sport yet is inhibited due to the disease
• differing daily activity levels and patterns which can affect the level of pain experienced

So how does a surgeon/consultant decide the best time to intervene and undertake corrective surgery?

Trying to explain pain and the severity of it, is actually extremely difficult, so there a number of Patient Reported Outcome measures (PROs) to help quantify and analyse it. In consultations, patients are given one or more of these questionnaires to complete asking various questions about how much pain they feel when carrying out normal daily activities as well as their aspirations when reaching full health again. The most commonly used are:

• Oxford hip and knee score from the UK
• WOMAC, from Canada
• EQ5D or EuroQol, from Europe

The answers to these are used in conjunction with physical diagnosis (scans, x-rays etc) by the surgeon to monitor a patient’s progress in relation to a surgical intervention.

However, until recently this exercise was carried out at the time of the first consultation, with the paper based answers then kept in the patient file. This could then be used for reference in following appointments. Clinical follow up is very expensive, and paper forms need sending out and then filing, so are expensive too. As a result, some of the team at the MSk Lab whilst carrying out research spotted an opportunity to use the web. The team set about developing a tool which would maximise the use of the data collected. If they got it right, it would engage and empower the patient, extending its purpose to form part of the recovery progress while creating a benchmarking tool... thus was borne, Joint Pro.

Joint Pro is a low-cost based tool that electronically captures patient reported outcomes (PRO’s). These are evaluated using validated PRO instruments (Oxford Scores and EQ5D), as well as a novel patient centred outcomes (PCO’s) instrument developed in the MSk Lab. The latter is unique in enabling us to evaluate outcomes in the context of each individual patients aspirations, thus heightening patient relevance and sensitivity.

Joint Pro enables patients to track their progress over time whilst viewing their scores in the context of a patient matched group and their own individual aspirations. This facilitates partnership with the medical team by providing a platform for patients to co-own their surgical episode – empowering patients to set personal aspirations, make treatment decisions and direct their functional rehabilitation.

The system also benefits the clinician with an analysis tool, facilitating decision making related to interventions and regular access to the patients progress. Researchers will also be able to explore the data and mine it to seek factors that influence clinical effectiveness, thus forming and contributing to future treatments.

So how much pain are you in?.....use Joint Pro and find out now....

For further information please contact: Miss Emily Moore (Emily.moore@imperial.ac.uk)
By Zoe Williams

Sir Stuart Lipton, (a major Property Developer,) is one of the founders of Chelsfield Partners (Real Estate Investment Company) and over the past thirty years, has been instrumental in shaping numerous commercial developments that have had an impact on the London skyline, such as; Broadgate in the City, Chiswick Park (West London) and Stockley Park (West London).

Sir Stuart Lipton started researching Orthopaedic Consultants and came across Professor Cobb’s name... “After thorough research, I knew that Professor Cobb was the ‘man’ to see. He came with many a glowing recommendation and he also works for Imperial, which is great kudos in itself and I know first-hand of the high calibre of research produced by Professor Cobb and the team at the MSk Lab.”

They met for the first time in early 2013 and Stuart was told he needed two operations. After several lengthy consultations, it was decided that Professor Cobb would proceed with surgery sooner rather than later, due to the debilitating effects of the pain on Stuart. He was sent for x-rays and scans, and a personalised operating plan was created, from ‘Joint Analysis’. The two procedures could not be done at the same time, so Stuart opted to have a hip resurfacing done first, as it was causing him the most discomfort. The procedure took place in April 2013, followed by a uni-knee (Oxford) replacement in November 2013.

Outside of work, Sir Stuart has a number of commitments and interests. He is an active board member in the arts world, he attends the gym at least 4 times a week and enjoys walking.

“Coincidently, some years ago, I was on the Imperial board of governors for 13 years, I was involved with developing part of the South Kensington Campus, including the acquisition of peripheral buildings and the IRDB at Hammersmith Campus. I had not heard of Professor Cobb during this time, or I would have turned to him when I started experiencing knee and hip pain.” Sir Stuart Lipton recalls.

In 2012, he started experiencing some pain in his knee and hip when walking. Over time it worsened. He sought advice from his doctor, who told him that he would probably need an operation (or two).

Sir Stuart had a positive experience in hospital, as he recalls; “I remember the first day post-operation, getting up and walking around. It was slow, but relatively pain free - I was amazed. I was given a pain button, which I never had to use. Professor Cobb came round for brief visits, which were carried out in a very reassuring manner. It motivated me to have the confidence to believe that I would get back to an active routine at the gym which is important ‘me-time’.”

As soon as he was discharged from hospital, Sir Stuart Lipton started seeing a physiotherapist.

His recovery has been slow, as he is still experiencing some pain and weakness in his ‘glute; he is not back to his gruelling workouts at the gym quite yet.

“Prior to my operations, I was invited to the MSk Lab for a gait assessment. The testing was very interesting, and I especially enjoyed finding out more about my gait and how my hip and knee disease was affecting the way I walk. It was very rewarding to be part of the research and to know that I am contributing to a more in-depth understanding of Arthritis. I feel that the NHS is so un-transparent and has no real public face. It was great to see inside the Lab and inspiring to see the diversity of work and research going on.”

We look forward to welcoming Sir Stuart Lipton back (and putting him through his paces) in a couple of months when we will be carrying out 6 month post operation testing.

Donate

We don’t just want your body, research is expensive, and the speed of our development is restrained by what we can afford, so financial contributions are very welcome. Imperial College is a registered charity and there are a number of ways you can give; please visit our Just Giving page (http://www.justgiving.com/justin-cobb) or contact Mr Matthew Minns on either: m.minns@imperial.ac.uk or 020 3311 1448.
Wearable Devices for Diagnosis and Treatment of OA

By Dr Tom Burton

Dr Burton’s research has led to the development of low cost, simple to use technology capable of accurate, fast and unobtrusive measurements of foot placement and pressure while a person carries out activities of daily living – all you need are the insoles he has developed and the app to collate the data. It is hoped that this enhanced real-time, bio-feedback can be used to track progress from the very first instance of injury, osteoarthritis (OA) diagnosis or following treatment – it could also be used in training. In this way patients can get real quantitative feedback relating to their treatment which will aid with the issues of compliance, understanding and motivation associated with long term degenerative diseases.

On Thursday 20th February 2014, Dr Tom Burton of the MSk Lab took part in the Imperial Fringe at South Kensington Campus, which was showcasing research outputs throughout the college in collaboration with the arts. It was the first time his technology has been taken outside of the research lab and tried for a prolonged period time and with some very enthusiastic users – Imperial Dance Society.

“I was a little apprehensive about taking the ‘smart insoles’ to the festival, as they are still being refined and only used by me for short periods time in the lab - just generally walking around to ensure that the technology connects and streams the data to the app I have built. It was great to see how the foot forces of the dancers differed and the dancers themselves were amazed to see the results generated on the big screen – it was inspiring and certainly gave me food for thought on the potential applications of this idea.” commented Dr Tom Burton.

Research to date has identified markers in the gait of individuals which can be used to predict a person’s risk of developing OA. By focusing on monitoring a person’s gait and the early detection of these markers it is hoped that preventative measures can be employed to retrain correct gait patterns as a preventative measure, to start management of OA as soon as possible or to monitor progress following treatment. Whilst a number of devices are available for gait analysis most are research tools without an end user in mind or are prohibitively expensive. It is hoped this low cost solution will provide greater access to the technology for the everyday consumer.

Design Automation of Patient Specific Guides ... “how you doing Grasshopper?”

Mr Dekani Fisher

Mr Dekani Fisher, one of the newer members of the MSk Lab (been here just under a year), is definitely no grasshopper when it comes to computer modelling and is trailblazing research into 3D printed patient specific guides.

Dekani is using Grasshopper (a 3D modelling algorithm editor) to automate the creation of patient specific guide models. This greatly reduces the time to accurately match the design to the patient’s bone structure – from days down to minutes. A Matlab algorithm (developed by Dr Susannah Clarke) is used to generate patient specific point data in the form of text files which are then used as input for Dekani’s Grasshopper system.

This allows for the quick generation of a patient specific guide’s 3D computer model, which is then built into our 3D printer overnight, which he is also responsible for. This allows for the guide to go from being scan data to being in the operation theatre within 24 hours. The overall aim is to reduce costs, streamline processes and allow for accurate implementation of surgical implants to improve the precision of joint replacement surgery.

Engage

There are a number of ways you can keep up to date with the MSk Lab and what we are working on. You can visit or link to any of our networks.

If you have any further queries please contact Mrs Kathy Lewis: Kathy.lewis@imperial.ac.uk or call 020 3313 0970.

http://www2.imperial.ac.uk/blog/msklab

http://www.flickr.com/people/84938068@N03/

@Great_Debate_UK

www.imperial.ac.uk/medicine/msklab
Have you ever wondered why we have two arms and two legs?

By the Bone Boffin

It’s a basic body plan that was evolved by the first fish which had fore and aft fins. As fish evolved into amphibians, mammals and eventually humans, the genes that were coded for this basic body plan did not change. As a result we also possess two fore and aft limbs. The shape of our limbs has evolved from fins into arms, legs, hands and feet – but the basic plan remains intact.

So it appears that the basic shape of our limbs is determined by our genes. We call this phenomenon ‘evolutionary constraint’. Essentially organisms resemble their ancestors because they share the same genes that code for the body plan. In much the same way as children resemble their parents through shared genetic heritage. Unfortunately for us this also means that any diseases, such as osteoarthritis can run in families.

Evolutionary origins of osteoarthritis

Osteoarthritis is essentially a disease caused by wear and tear of joints, particularly the hip. Like many mechanical devices it is important that the shape of the hip minimises wear. For this reason the hip has evolved to be a ball and socket joint. In healthy people the head of the thigh bone is spherical and matches perfectly with the socket in the pelvis. If the shape becomes deformed through injury the cartilage and bone can wear away leading to osteoarthritis.

Unfortunately in a small number of babies the hip joint becomes deformed and dislocated before birth. This condition is referred to as developmental dysplasia of the hip. In adult life the deformed hip joint causes excessive wear, which damages the cartilage and bone causing osteoarthritis. In fact about 10% of osteoarthritis is associated with developmental dysplasia.

Chicken and egg story

At present clinicians do not know what causes fetal hip dysplasia. It is thought that faulty genes may build an abnormal cartilage anlagen and as a result the joint dislocates when the fetus kicks. Alternatively it has been suggested that exercise (ie kicking) might cause the primitive joint to dislocate, leading to abnormal loading and distortion of joint shape. Therefore we are studying gestational development to determine whether abnormal joint shape develops before the dislocation or vice versa.

Early results indicate that abnormal shapes develop before dislocation. Specifically the socket is too shallow to hold all the ball in place when the fetus kicks. If this is the case, we may be able to devise methods for imaging the fetal hip joint in the womb and devise clinical interventions to prevent dislocation, thereby preventing osteoarthritis before disease develops.

Involve:

*New Study Starting Soon*

Ms Janet Deane is a clinical Doctoral Research Fellow and Physiotherapist whose research has been funded by Arthritis Research UK. Janet’s research is investigating the biomechanical strategies employed by people with and without disc problems in order to understand why some people with disc problems experience pain on a long term basis and others do not. Through this research we aim to improve the efficacy of treatment for disc related low back pain and related disorders.

We are currently seeking health volunteers (over 45 years of age) to take part in this study. Testing will involve a free MRI of the lumbar spine and a two hour biomechanical assessment where we look at spinal movement and muscle activations during a series of familiar day to day tasks.

Please contact Ms Janet Deane for further details on: j.deane@imperial.ac.uk

There are a number of other studies we are recruiting healthy, pre and post-operative volunteers for:

- Gait using an instrumented treadmill
- Gait using vicon motion sensors
- Gait using treadmill and motion sensors
- Motor control function
- Impact of flexibility.

If any of these are of interest please contact Mr David Egbosima on d.egbosima@imperial.ac.uk or call 020 3311 7326. Further details can be found at: http://www1.imperial.ac.uk/msklab/enagage/