Meniscus Arthritis – An old disease with a new perspective

Torn menisci have for long been considered to be caused by acute knee trauma. However, most meniscal lesions appear without any prior joint injury. Instead, they are the outcome of a slow degenerative process that is often part of the development of our most common chronic joint disease – osteoarthritis – a public health concern. Martin Englund, Professor at the Clinical Epidemiology Unit, Orthopaedics, recently received a grant from the European Research Council to support his world leading research on the role of the meniscus in knee osteoarthritis. In this project, Martin Englund aims to determine the pathogenesis of meniscus degradation, as well as to find new biomarkers for the disease and to open up for new treatments.

The first goal of the project is to determine the molecular processes of the breakdown of the meniscus. In collaboration with staff from the Tissue Donor Bank, Lund and clinicians from Trelleborg Hospital, Martin Englund has created a biobank with tissues from e.g. knee prosthesis surgeries and knee arthroscopies. This material will primarily be analyzed using mass spectrometry at the Biomedical Centre, Lund, to determine the molecular composition of both healthy and sick menisci. The results will serve as a foundation to better understand the development of meniscus degradation and early osteoarthritis.

Another goal within the project is to find a biomarker that signals the degeneration of the meniscus. Martin Englund believes that there could be peptides or other breakdown products from the meniscus ending up in the joint fluid or the bloodstream. The ultimate goal would be to be able to determine the status of the meniscus (and joint health) by analyzing a blood sample.

In conjunction with these goals, Martin Englund will also monitor the development of early osteoarthritis in patients undergoing knee arthroscopy, who are at higher risk for future knee osteoarthritis. The plan is to perform repeat knee imaging in these patients using the state-of-the-art 7-Tesla magnetic resonance imaging (MRI) instrument at Lund University. The imaging protocol will be designed to detect changes in the quality of the meniscus and cartilage rather than just loss or destruction of tissue. By following patients longitudinally with scans before, as well as 2 and 5 years after surgery, Martin Englund is hoping to link the observations from these scans with the results obtained from the analyses using mass spectrometry. This will provide a more complete understanding of meniscus degeneration, from its underlying molecular changes to the structural changes associated with actual disease in patients.

So why is it important to address meniscus degradation? The answer is that it seems to be a very important part of early osteoarthritis development. This is especially important because the risk of developing knee osteoarthritis increases with increased body weight and age; variables which are on the rise in the population. Martin Englund and his research group have previously predicted the number of new knee osteoarthritis cases expected to seek health care for their symptoms. The results suggest an increase of about 30 000 more knee osteoarthritis patients in Skåne alone over the
next 15 years, adding up to over 100 000 patients living with the disease in the region (or about 1 million patients living with knee osteoarthritis in Sweden). This poses a significant burden on primary and secondary health care systems, which must be prepared to take care of all these patients. Prevention of meniscus degradation and in turn osteoarthritis could be a key breakthrough in facing the growing challenge posed by osteoarthritis.

“It’s not realistic to think we will have a cure for meniscus degradation in 5 years. However, in a best case scenario we will have a better understanding of the molecular process underlying this degeneration, good biomarkers, and some potential targets for development of new treatments against the disease” says Martin Englund.

- Joakim Hising