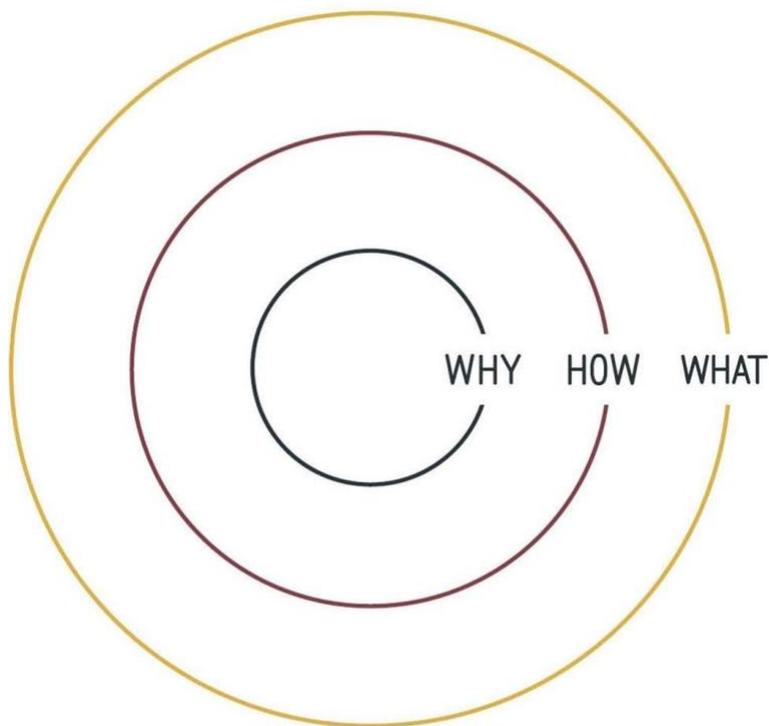


**Ph.D. Cup 2021 – Ansøger Peter Muhareb Udby**

**Summary (formidlingstekst)**



**Why** – *Because back pain is the leading cause of global disability*

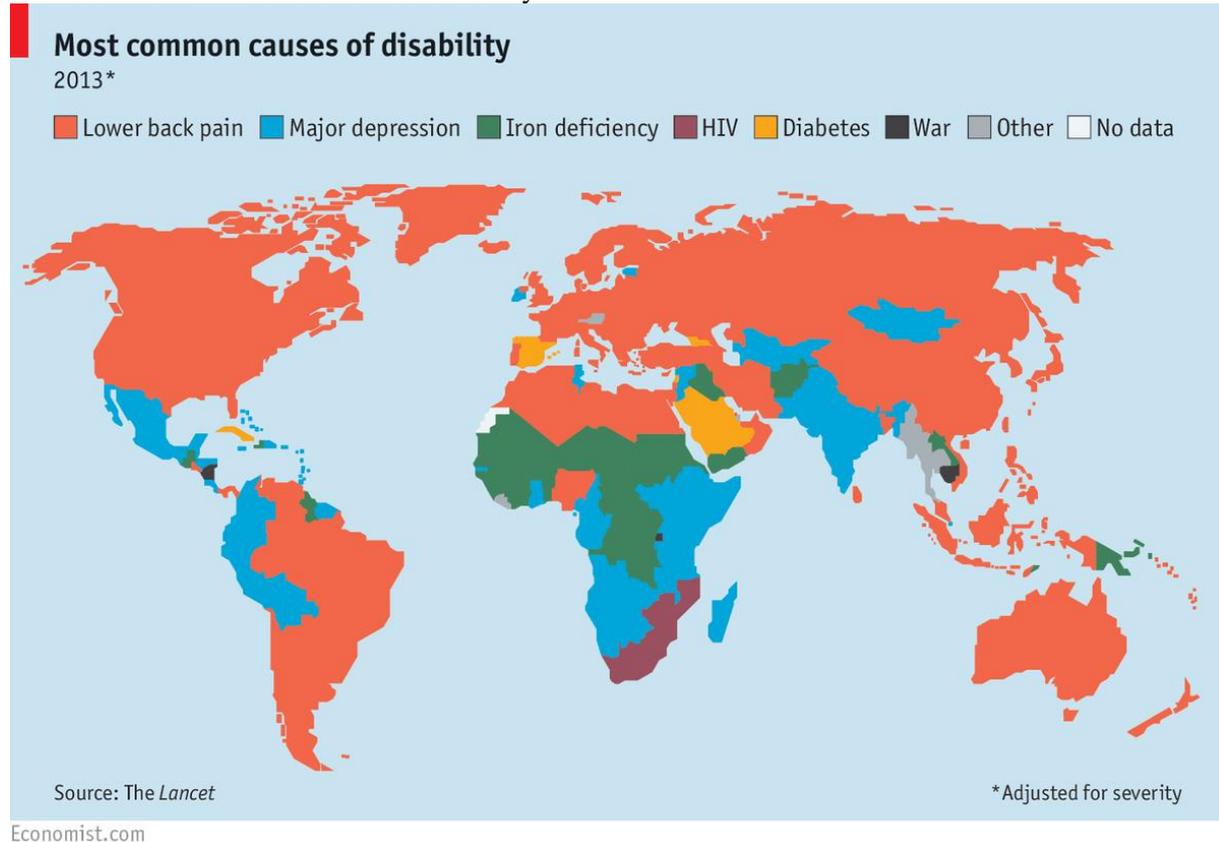
**How**- *Scientific studies represent the best possible way to solve a problem*

**What** – *A Ph.D. thesis to investigate the cause of back pain*

Back pain is the most common cause of global disability (Figure 1). Despite annual costs of 100 billion US dollars, the equivalent of buying Costa Rica, in health-care expenses related to back pain, this pandemic continues to grow. Degenerative spine conditions are the primary cause of back pain but not much is understood in regards to the mechanism related to the development of back pain.

Figure 1:

Most common cause of worldwide disability



Modic changes (MCs) are commonly found on Magnetic Resonance Imaging (MRI) in adults with back pain. On a standard MRI such changes within the spine will light up, which has caused many questions in regards to their cause, relation to back pain, and possible treatment.

The characteristics of MC have been classified into three different types and are visualized on MRI in the endplates and bone marrow adjacent to a degenerated intervertebral disc. MCs have been associated with low back pain (LBP) and disability in previous studies. Additionally, MCs have been associated with a less successful outcome in LBP patients treated surgically. However, previous studies have been limited by small, heterogeneous cohorts with short follow-up. In addition, limited

information is available on the long-term prognosis of patients with LBP and MCs not receiving surgical treatment.

The purpose of the thesis was to evaluate the possible association between MCs, disc degeneration (DD), facet-joint degeneration (FJD), and patient-reported outcomes (PRO) at long-term follow-up. Moreover, we aimed to evaluate if preoperative MCs are associated with outcome after surgery for lumbar disc herniation (LDH).

The first two studies included patients with LBP recruited from a previous randomized controlled trial. Of the original 207 patients in the randomized cohort, 204 had a lumbar MRI performed in 2004-2005.

Study I focused on the possible association between the baseline MCs on MRI and disability 13-years later. Patients were stratified based on the presence (+MC group) or absence (-MC group) of MCs. There were 82 patients in the +MC group and 122 in the -MC group. 170 patients (83%) were available for 13-year follow-up. At baseline, demographics, PRO (including Roland-Morris Disability Questionnaire (RMDQ)) and pain scores were comparable with no statistically significant difference between the two groups. At 13-year follow-up the +MC group had statistically significantly better RMDQ-scores and less sick-leave in the past year compared to the -MC group.

In study II, the same cohort was analysed in terms of MRI parameters including DD (defined by Pfirrmann grade >3), FJD (defined by Fujiwara grade >2), and MCs. Neither DD, FJD nor MCs at baseline were found to be associated with increased 13-year disability or higher pain scores. Both weekly physical activity at leisure and MCs at baseline were associated with less long-term disability.

Study III was a registry-based cohort study on patients with LDH who underwent surgery for disc herniation. We included 620 patients, all with two-year postoperative follow-up. We analysed preoperative MRIs in all included patients and found MCs present in 290 patients (47%). Preoperative demographics and PRO were comparable between the +MC

and -MC groups. An overall statistically and clinically significant improvement in PRO after discectomy was found in both groups. We found no difference in PRO between the +/-MC groups.

We conclude that MCs in LBP patients do not appear to be associated with long-term disability. Baseline degenerative MRI findings including DD and FJD are likewise not associated with long-term disability. Furthermore, MCs do not appear to be associated with outcome after primary lumbar disc herniation surgery.