

by a VAScale from 0-100, where 100 indicated pre-injury knee function and 0 indicated the impossibility of performing daily activities. In addition, global rating of change (GRC), detecting self-assessed efficacy from the rehabilitation program, was collected using a 7-point scale (-3 to 3) that includes descriptors ranging from “very much worse (-3), unchanged (0)” to “completely recovered (3)”.

Results: The patient performed 27 sessions with a mean of 8.6 exercises per session. Acceptable self-reported pain was recorded during the program with a median of 0 (min 0 - max 2). Decreased pain was recorded both during and after each training session with a median of 1 (min 1 - max 1) and a median of 0 (min 0 - max 0), week one and 12, respectively. Quadriceps strength (PT) improved from a 19% deficit to a 1% deficit between legs, and hamstrings strength (PT) improved from a 13% deficit to 11% stronger injured leg compared with the uninjured leg. Quadriceps strength (TW) improved from a 10% deficit to 4% stronger injured leg compared with the uninjured leg, and hamstrings strength (TW) improved from a 13% deficit to 8% stronger injured leg compared with the uninjured leg. The OLH improved from a 35% deficit to a 5% deficit between legs and for 6MTH from a 25% deficit to an 8% deficit between legs, before and after the rehabilitation program, respectively. The 0-100 VAScale improved from 63 to 97 (54%) over the 12 weeks and the GRC was 2 on the 7-point scale, indicating “a lot better”.

Conclusions: The twelve-week neuromuscular and strength training program was successfully implemented in a middle-aged patient with degenerative meniscus tear, in terms of acceptable self-reported pain both during and after each training session, decreased pain throughout the program, improved muscle strength and physical performance, in addition to improved global rating of knee function.

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DEGENERATION OF INTERVERTEBRAL DISC: CORRELATION BETWEEN MRI, HISTOLOGICAL AND TRANSCRIPTS ANALYSIS

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Purpose: Intervertebral disc (IVD) degeneration is the major cause of chronic low back pain. A better understanding of the physiopathology of IVD degeneration is essential and correlation between tissular and cellular changes is poorly investigated. In this context, the present work was focused on the physiopathological characterization of IVD aging in the rabbit in order to define a potential correlation between tissular (MRI and histological study) and cellular (transcripts analysis) changes.

Methods: New Zealand white rabbits (1-, 6- and 30-month-old) were used. IVD aging was determined by MRI and histological studies as well as by a phenotypic characterization of cells isolated from annulus fibrosus and nucleus pulposus, respectively the central and outer parts of IVD. MRI was scored according to the Pfirrmann's classification. After alcian blue and masson's trichrome stainings, the histological samples were evaluated using a modified Boos's scoring. The age-dependent phenotypic alterations of IVD cells were investigated after total mRNAs extraction by real-time PCR.

Results: MRI reveals a grading decrease in IVD signal intensity associated with a Pfirrmann's grade of 1, 2 and 3 after 1, 6 and 30 months respectively. At histological level, IVD aging was associated with a significant increase in the Boos's scoring as evidenced by the formation of tears and cracks, the reduction of cellularity and a marked mucous degeneration. These data indicate the existence of an aging process of rabbit IVD likely similar to that occurring in human IVD. In parallel with this histological aging, significant alterations in the expression of transcripts coding for type I and II collagens, aggrecan, BMP2, MMP13, HtrA1, MGP and P21 were observed. These changes in gene expression suggest a marked modification of cell phenotype as well as the existence of some compensatory mechanisms occurring during IVD aging.

Conclusions: Our results indicate that age-associated IVD degeneration in the rabbit is likely comparable to that observed in humans with a correlation between dehydration of nucleus pulposus, disorganisation of the extracellular matrix and an intense alteration in cell phenotype.

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BIOMECHANICAL CONSEQUENCES OF ADJACENT SEGMENT LUMBAR FACET JOINT OSTEOARTHRITIS AFTER POSTERIOR LUMBAR INTERBODY FUSION

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Purpose: The purpose of this study was to evaluate the development of osteoarthritis in the neighboring segment after posterior lumbar spine interbody fusion (PLIF) procedures. The disc acts as a shock absorber in between the vertebrae, whereas the paired facet joints restrain motion. As the facet joints age, they can become incompetent and allow too much flexion, allowing one vertebral body to slip forward on the other. This slippage is known as a degenerative spondylolisthesis. PLIF with pedicle screw fixation is a most reasonable method for treatment of spondylolisthesis. The goal of the procedure is to stimulate the vertebrae to fuse together. The fusion creates a rigid and immovable column of bone in the otherwise flexible section of the spine. Adjacent segment degeneration is thought to impair long-term outcome after the fusion. As a consequence the biomechanics of the lumbar spine alters as the neighboring segment osteoarthritis progresses.

Methods: Between 1992 and 2002, we treated 154 consecutive patients (81 females, 73 males) with PLIF and pedicle screw fixation. Their mean age at the time of surgery was 40.5 years. The mean follow-up period was 13.2 years. Disorders treated by this procedure included degenerative and isthmus spondylolisthesis L5-S1. The follow-up examination included the Oswestry Disability Index (ODI), physical assessment, and radiological evaluation. Pre- and postoperative radiographs and CT examination were analyzed to assess degenerative changes. Intervertebral disc heights were measured before and after surgery.

Results: The Oswestry disability index before and after the operation showed a marked improvement from average 358 to 224 point. Unfortunately, the average outcome index rose to 238 after five years and 286 at ten years time due to degenerative pathology in the neighboring segments. On the x-ray and CT examination progressively increasing facet joint osteoarthritis, intervertebral space narrowing and increase in the intersegmental lordosis of the neighboring segments was seen over the years. All intervertebral disc heights adjacent to the fusion decreased after surgery ($P < 0.05$).

Conclusions: Until very recently, there was no data on the long-term outcome of interbody fusion. At postoperative follow-up, patients who underwent surgery had significantly better scores for both pain and daily function. The benefits were reduced after ten years. Spinal fusion for pain is less uniformly successful because the cause of the pain cannot always be completely identified. The rigid interbody fusion increases the mechanical stress on the surrounding segments which leads to the proliferation of degenerative pathology.

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(COST) EFFECTIVENESS OF SURGERY VERSUS PROLONGED CONSERVATIVE TREATMENT IN LUMBAR STENOSIS: DESIGN OF A RANDOMIZED CONTROLLED TRIAL

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Purpose: Intermittent neurogenic claudication due to lumbar stenosis is frequently diagnosed among older persons. Patients are operated on because of intolerable pain and/or severe decreased daily activities, with the aim of pain relief and conservation or restoration of normal day-to-day activities. The duration of persistent back/leg pain before elective surgery is offered is not a case of evidence-based medicine but is a reflection of normal practice. Although there is consensus that surgery is only offered in the case of persistent pain, the timing of this treatment seems to depend on local production capacity and patient and doctor preferences rather than evidence-based practice.

The main goal of this comparative study is to investigate whether a period of at least 3 months of persistent intermittent neurogenic claudication is justified as a solid indication for surgery and superior to a prolonged conservative treatment policy for this condition.

Research questions are: