Conclusions: Continuous intra-articular use of Hyalubrix in hip OA affected patients showed to be effective even in the long-term. This study shows how even at 18 months the use of Hyalubrix is effective in maintaining the positive effects obtained after the very first injection. This has not only direct positive consequences, as the reduction in NSAID consumption may also reduce the costs associated with managing the disease and the costs associated with side-effects induced by NSAIDs.

Purpose: Residual incongruities following intra-articular fractures have been associated with aberrant articular contact stress distributions, linked indirectly to the onset of post-traumatic osteoarthritis (OA). The purpose of this study was to improve current understanding of the relationship between patterns of abnormal contact stress exposure and of cartilage degeneration, using advanced image analysis techniques and patient-specific finite element (FE) modeling.

Methods: Articular joint contact stresses following surgical fracture reduction were quantified using a validated patient-specific contact finite element (FE) analysis. FE models were created from post-reduction CT studies in a series of 11 tibial plafond fracture patients, including both the fractured ankles and their intact contralaterals. The chronic contact stress exposure over a simulated gait cycle was calculated as a metric of degeneration propensity. Cartilage outcome was evaluated from dual contrast multi-detector CTs obtained six months and two years post injury, for six patients. The contrast agent injected into the joints enabled segmentation of the subchondral bone and cartilage surfaces by a senior orthopaedic resident. Cartilage thickness was then calculated across the articulating surface using purpose-written MATLAB code. Registration of the post-op FE simulations to the two year cartilage thickness maps was necessary for spatial comparison (performed using Geomagic Studio software). This was accomplished by using metallic screws implanted during surgical reduction as fiducial markers. The registered cartilage thickness maps were quantitatively compared to the FE-computed contact stress exposures.

Results: Localized areas of cartilage thinning generally corresponded to areas exposed to elevated contact stresses. Contact stress exposures of 2 MPa-s or greater were associated with a focal loss of cartilage [Fig 2]. For these six patients, the percent reduction in cartilage volumes from a pre-fractured state ranged from 11 to 81%. The most severely comminuted fractures experienced the greatest loss of cartilage, in addition to having the greatest contact stresses as assessed by FE. The area of cartilage loss ranged from 0 to 241 mm².

Conclusions: Clinical experience has shown that residual articular incongruity is poorly tolerated and is a likely factor in the progression of joint degeneration. FE modeling coupled with advanced imaging analysis techniques is improving our understanding of the mechanopathology of PTOA. The results from this study support an association between elevated contact stress exposure and focal cartilage degeneration. No conclusive statements relating aberrant contact stresses to cartilage thinning can yet be made from the limited number of patients included. However, there is a clear spatial connection between large stress exposures over small and large regions, and focal areas with cartilage degeneration for this series of patients. Restoration of normal subchondral anatomy may decrease cartilage loss and slow the development of post-traumatic osteoarthritis. Techniques are improving our understanding of the mechanopathology of PTOA.

Registration enabled point-by-point correlation between contact stress exposure and cartilage thickness measures made over the loaded articular surface. Cartilage Thickness decreases as the exposure exceeds 2 MPa-s.

Purpose: Intra-articular (IA) injections of hyaluronic acid (HA) have been shown to improve self-report measures in patients with knee osteoarthritis (OA). Effects of HA injection on functional outcome measures for this patient group is not well known and clinical experience leads us to believe that not everyone benefits from this treatment. Therefore, the purpose of this study was to study the effects of HA injections on self-report and functional measures in patients with knee OA and to identify clinical and/or radiographic characteristics of those likely to respond to HA injections.

Methods: Forty-eight subjects were recruited and tested prior to, and no later than 3 weeks following the last of 5 weekly injections. Knee function was assessed with knee specific questionnaires (Knee Outcome Survey (KOS) and Knee OA Outcome Score (KOOS)), a six minute walk (6MW), a stair climbing task (SCT), as well as knee range of motion (ROM) and Quadriceps strength measures. A set of 'a priori' defined criteria were used to identify responders (R) and non-responders (NR). Available radiographs were graded by a single physician according to the Kellgren-Lawrence (KL) scale.

Results: On average, self-report scores improved significantly following treatment, as did measures for the 6MW and SCT, ROM and muscle performance. Twenty subjects were classified as non-responders (NR), whereas 28 subjects, responders (R), improved markedly. Not only did R improve in self reported function, but in muscle performance, knee ROM, 6MW and SCT tests, whereas NR gained distance walked during the 6MW. Furthermore, R consistently improved performance of both the 6MW and the SCT, while the correlation did not hold true in the NR group.