Methods: 121 young (32 women, mean age 26.1 years) active adults with an acute ACL tear in a previously un-injured knee were included in a treatment RCT (the KANON-trial). Patients were randomized to either rehabilitation plus early ACL reconstruction (ACLR, n=62) or rehabilitation plus the option of having a delayed ACLR if needed (n=59). During the 5 year follow up period, 30 (51%) of those randomized to the latter group had a delayed ACLR. A complete set of sagittal MR images for baseline, 2, and 5 year follow-up was available for 106 participants. Cartilage thickness (ThC) was assessed by manual segmentation of the femorotibial cartilages with blinding to time point and treatment group. Change in ThC in the medial femoral compartment (MFTC) was considered the primary and subregions with the largest decrease (ordered value 1 = OV1) or increase in ThC (OV16) were considered secondary outcomes. ThC changes were analyzed according using an ‘as-treated’ approach (57 with early ACLR; 25 with delayed ACLR; 24 with rehabilitation alone) using the t-test (crude differences) and analysis of covariance (differences with adjustment for age, sex & BMI).

Results: The mean increase of ThC in MFTC between BL→Y2 of knees treated with rehab alone tended to be smaller than in knees treated with early ACLR, but the difference was not statistically significant (crude/adjusted p=0.18 / p=0.16, Table 1). In the same period, the ThC increase in MFTC of knees with delayed ACLR did not differ significantly from increase in knees with early ACLR (crude/adjusted p=0.45 / p=0.31) or knees without ACLR (p=0.68 / p=0.75 for crude/adjusted differences). In the subsequent observation period between Y2→Y5, no significant differences were observed between the three groups (crude/adjusted p=0.42/0.55).

In the period from BL→Y2, OV 1 was significantly more negative (crude/adjusted p=0.02/0.02) and OV 16 was significantly more positive (crude/adjusted p=0.04/0.03) for knees with early ACLR than for knees treated with rehab alone but differences were not significant in the subsequent period from Y2→Y5 (crude/adjusted p=0.09/0.14, Table 1). In knees with delayed ACLR both OV 1 and OV 16 tended to have a higher magnitude of change than in knees treated with rehab alone (BL→Y2: p<0.01/0.05 and Y2→Y5: p=0.07/0.04 for crude/adjusted differences). No significant differences were observed for OV1 and OV16 between knees treated with delay and early ACLR (crude/adjusted p=0.18/0.23).

Conclusions: MFTC cartilage thickness increased after acute ACL tear but this increase did not differ significantly between knees treated with (early or delayed) ACLR or knees treated with rehab alone. Our results suggest that an ACLR, performed early or at a later stage, may induce elevated magnitudes of subregional cartilage thickness change. This effect appears to occur during the period immediately after trauma/surgery but not in later periods.

52 EXCLUSION OF PATIENTS WITH SEQUENTIAL PRIMARY HIP OR KNEE REPLACEMENTS OVERESTIMATES THE RATES OF COMPLICATIONS FOLLOWING JOINT REPLACEMENT

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Purpose: Total joint arthroplasty (TJA) outcome studies have largely focused on recipients of a single primary TJA, excluding those with sequential TJAs during follow-up. The objectives of our study were to determine the proportion of first-time TJA recipients who go on to receive a subsequent TJA within two years of their index procedure, and to compare the demographic characteristics and rates of complications following the index arthroplasty for TJA recipients who did versus did not receive a subsequent elective primary TJA within two years.

Methods: We defined a cohort of patients who received their first primary elective TJA of the hip or knee for osteoarthritis (OA) between 2002-2009 utilizing health administrative data from Ontario, Canada. We excluded those who had received a primary or revision TJA prior to April 1, 2002, whose first procedure was non-elective (e.g. for cancer, fracture, or external cause of injury), and with a diagnosis of inflammatory arthritis. We compared baseline characteristics and rates of complications following the index arthroplasty for those who received a subsequent TJA within 2y versus (‘multiple’ group) and those who did not (‘single’ group). Logistic regression was used to determine the relationship between group (single versus multiple) and the occurrence of one or more complications associated with the index TJA, after controlling for covariates.

Results: Between April 1, 2002 and March 31, 2008, there were 97,374 patients who received their first primary elective TJA (37,670 index THAs and 59,704 index TKAs). Over the two-year follow-up from the index TJA, 24.5% of TKA recipients and 16.7% of THA recipients received a second TJA procedure. For the majority (~95%) of these individuals, the second procedure was a primary elective TJA of another hip or knee (20.4% of the entire cohort).

Compared with recipients of a single primary, elective TJA, recipients of multiple primary, elective TJAs were more likely to be female (60.5% versus 57.2%, p<0.0001), were younger (mean age 66.6y versus 67.1y, p<0.0001), had less comorbidity (Charlson score of 2+: 3.7% versus 4.3%, p<0.0001), were more likely to have received an index knee versus hip TJA (70% versus 59%, p<0.0001), had a shorter length of stay (4.7d versus 4.9d, p<0.0001), and were less likely to receive their index TJA at a teaching hospital (28.6% versus 30.6%, p<0.0001). Patients in the multiple group also had lower rates of complications following the index arthroplasty, including early revision (0.6% versus 1.3%, p<0.0001), and the occurrence of any complication (including DVT, PE, AMI, infection, and revision) (2.4% versus 3.8%, p<0.0001). Controlling for other factors, a subsequent primary TJA was associated with fewer complications following the index arthroplasty (adjusted OR 0.65, 95%CI 0.59-0.72).

Conclusions: In a population inception cohort undergoing their first primary elective hip or knee TJA, one in five patients went on to receive a second primary elective TJA within 2years of the index procedure. These individuals were systematically different from patients who did not have a subsequent primary TJA. Patients with sequential TJAs were, on average, healthier than those who did not, and were also less likely to have experienced a serious surgical complication related to the index procedure. Collectively, these results suggest that the routine exclusion of this substantial subgroup of patients from TJA outcomes studies results in systematic overestimation of the overall rates of surgical complications, and thus potentially underestimates patient-reported benefits.

53 POSTOPERATIVE EFFECTS OF NEUROMUSCULAR EXERCISE PRIOR TO HIP OR KNEE ARTHROPLASTY - A RANDOMISED CONTROLLED TRIAL

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Purpose: To investigate the postoperative efficacy of a supervised programme of neuromuscular exercise (NEMEX-TJR) prior to hip or knee arthroplasty.

Methods: Design: Randomised, assessor-blinded, controlled trial.

Setting: OUH Svendborg Hospital (regional), Odense University Hospital, Region of Southern Denmark.

Participants: 165 patients scheduled for hip or knee arthroplasty due to severe osteoarthritis

Interventions: An 8-week preoperative neuromuscular supervised exercise programme was delivered twice a week for one hour as an adjunct treatment to the standard arthroplasty procedure and compared with the standard arthroplasty procedure alone.
Main outcome measures: The primary outcome was self-reported physical function measured on the Activity of Daily Living (ADL) subscale in the HOOS/KOOS questionnaires for hip and knee patients, respectively. The primary endpoint was 3 months after surgery. The main secondary outcome was HOOS/KOOS Pain subscale.

Results: 165 patients randomised to the two groups were on average 67(5), 84(51) of the OA and 92(56%) were women. 153(93%) underwent planned surgery and were evaluated postoperatively. There was no statistically significant difference in treatment effects between hip or knee patients (p = 0.7370). Three months postoperatively (primary endpoint), no difference was found between groups for physical function (4.4, 95% CI -0.8 to 9.5) or pain (4.5, 95% CI -0.8 to 9.9). However, there was a statistically significant difference indicating an effect of exercise seen over the entire period (baseline to 3 months postoperatively) (p = 0.0029).

Conclusion: Eight weeks of supervised neuromuscular exercise prior to total joint arthroplasty (TJA) of the hip or knee did not confer additional benefits compared with TJA alone at 3 months after surgery. However, the intervention group experienced a statistically significant difference in physical function and pain, suggesting an earlier onset of postoperative recovery.

Trial registration: ClinicalTrials NCT01003756.

Large variability was seen in Harris Hip Scores and gait changes after total hip arthroplasty

<table>
<thead>
<tr>
<th></th>
<th>Preoperative Mean (SD)</th>
<th>Postoperative Mean (SD)</th>
<th>Mean Change (SD)</th>
<th>Change Range</th>
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<tr>
<td>Harris Hip Score</td>
<td>56.80 (13.94)</td>
<td>91.4 (10.9)</td>
<td>34.6 (16.1)</td>
<td>-10 to +65</td>
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<td>Speed (m/s)</td>
<td>1.02 (0.24)</td>
<td>1.19 (0.19)</td>
<td>0.17 (0.2)</td>
<td>-0.36 to +0.8</td>
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<td>Dynamic Hip Range of Motion (deg)</td>
<td>15.5 (6.0)</td>
<td>25.4 (6.2)</td>
<td>8.9 (5.8)</td>
<td>-14.4 to +23.0</td>
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<tr>
<td>Peak Flexion Moment (%BWxHt)</td>
<td>4.29 (1.60)</td>
<td>5.95 (2.02)</td>
<td>1.66 (1.89)</td>
<td>-5.08 to +7.01</td>
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<tr>
<td>Peak Extension Moment (%BWxHt)</td>
<td>1.78 (0.79)</td>
<td>2.74 (1.07)</td>
<td>0.96 (1.03)</td>
<td>-1.40 to +5.08</td>
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<tr>
<td>Peak Adduction Moment (%BWxHt)</td>
<td>3.42 (1.07)</td>
<td>3.46 (0.96)</td>
<td>0.03 (1.15)</td>
<td>-2.68 to +3.64</td>
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<tr>
<td>Peak Abduction Moment (%BWxHt)</td>
<td>1.64 (0.84)</td>
<td>1.91 (0.85)</td>
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<td>-1.82 to +2.35</td>
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<td>Peak Internal Rotation Moment (%BWxHt)</td>
<td>0.37 (0.21)</td>
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<td>0.12 (0.19)</td>
<td>-0.35 to +0.63</td>
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<tr>
<td>Peak External Rotation Moment (%BWxHt)</td>
<td>0.33 (0.21)</td>
<td>0.42 (0.23)</td>
<td>0.09 (0.21)</td>
<td>-0.41 to 0.68</td>
</tr>
</tbody>
</table>

AGE, GENDER, AND BODY MASS INDEX DO NOT EXPLAIN INDIVIDUAL VARIABILITY IN CLINICAL AND GAIT RECOVERY AFTER TOTAL HIP ARTHROPLASTY

O.A. Behery, K.C. Foucher. Rush Univ. Med. Ctr., Chicago, IL, USA

Purpose: After undergoing total hip arthroplasty (THA) for hip osteoarthritis, many patients have residual pain and functional deficits and persistent biomechanical deficits measured using quantitative gait analysis. Age, gender and body mass index (BMI) have been linked to variability in clinical outcomes, with results differing by study. The effect of these factors on the improvement in gait has never been studied. The purpose of this study was to determine whether age, gender, or BMI are related to change in clinical scores and gait variables after THA.

Methods: We identified 125 subjects from an IRB-approved data repository who were evaluated before and primary unilateral THA: age 61 ± 10 y (range 27-85); 63 M / 62 F; BMI 28.2 ± 5.0 kg/m2 (range 18.5-47.4); follow-up time 15±9 mos (range 6-37); Gait analysis was conducted using standard published methods. Variables analyzed were were speed, dynamic hip range of motion and 3D peak external moments normalized to body weight and height (%BWxHt), averaged from 2-4 trials collected at subjects’ self-selected normal walking speed. The clinical outcome tool used was the Harris hip score (HHS), which includes pain, function and activity domains and is scored from 2-100 (best). We used Pearson correlations to assess relationships between age, BMI and gender and the change in HHS and gait variables.

Results: Substantial variation was seen in HHS and gait changes (Table 1). On average, all variables significantly increased (p<0.001)

Figure 1. Histograms showing the pre-to-post-operative changes in peak adduction moment and Harris Hip Score in our subject sample illustrate substantial individual variation in improvement of clinical and gait outcomes after total hip arthroplasty. Notably, the Harris Hip Score decreased for 4 (3%) subjects, while the peak adduction moment declined for 61 (49%) subjects.

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IN HUMAN CHONDROCYTES DNMT-1 PLAYS A KEY ROLE IN THE EXPRESSION OF SEVERAL GENES ASSOCIATED WITH THE PATHOGENESIS OF OSTEOARTHRITIS (OA)

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Introduction: Recent evidence points to chromatin remodeling as a key event in the expression of several genes associated with OA pathogenesis. IL-1β is the principal cytokine involved in cartilage catabolism in OA. The aim of this study was to investigate (a) whether IL-1β modulates DNA methylation content in human chondrocytes; and if so how the DNA methylation status affect the expression of selected