estimating equations (GEE) were used to model the relationship between outcomes and antibiotic use by time interaction.

Results: A total of 515 new antibiotic users were matched with 515 non-users. After matching, all standardized differences of means were less than 0.05 indicating that covariates were well balanced between groups. No association between the use of antibiotic and changes in WOMAC pain and function scores was found (Table 1). No associations were also observed in multiple stratified analyses based on different duration of antibiotic use, particular classes of antibiotics, or different baseline WOMAC pain or disability levels.

Table 1. Longitudinal analysis (with treatment*time interaction) of WOMAC subcategories and antibiotics use

	β coefficient	95% CI	P value
WOMAC Pain	-0.008	(-0.08 to 0.07)	0.8
WOMAC Function	-0.014	(-0.24 to 0.21)	0.9

Conclusion: These findings do not support the effects of antibiotics on knee OA pain or disability. More research is needed on the role of microbiota and its modulation in OA.

REFERENCES:

- [1] Boer, C.G., Radjabzadeh, D., Medina-Gomez, C. et al. Intestinal microbiome composition and its relation to joint pain and inflammation. *Nat Commun* 10, 4881 (2019). <https://doi.org/10.1038/s41467-019-12873-4>

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POS1091

KNEE JOINT DISTRACTION RESULTS IN MRI CARTILAGE THICKNESS INCREASE UP TO TEN YEARS AFTER TREATMENT

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Background: Knee joint distraction (KJD) is a joint-preserving treatment option for younger (age <65 years) knee osteoarthritis (OA) patients. It has shown clinical improvement for up to nine years after treatment. Radiographs and MRI scans

Figure 1: Top: average cartilage thickness of all patients whose medial compartment was the most affected, at baseline (n=18) and one (n=18), two (n=18), five (n=15), seven (n=11) and ten (n=7) years after treatment with knee joint distraction. The color range is based on the minimum and maximum average values of the femur (0.78-3.00) and tibia (0.80-3.92) separately. Bottom: change in cartilage thickness compared to baseline, for all patients whose medial compartment was the most affected, after one (n=18), two (n=18), five (n=15), seven (n=11) and ten (n=7) years after treatment with knee joint distraction. Statistically significant changes are indicated by the darker color map (p<0.05) while non-significant areas are shown with faded colors (p>0.05). Blue indicates an increase and red a decrease in cartilage thickness compared to baseline. All results are viewed on average right femur and tibia articular cartilage surfaces.

have previously shown cartilage regeneration activity, especially in the first two years after treatment. However, MRIs have not been evaluated more than five years after this treatment.

Objectives: To evaluate MRI cartilage thickness up to ten years after KJD treatment.

Methods: Patients (n=20) with end-stage knee OA, indicated for total knee arthroplasty (TKA) but <60 years old, were treated with KJD. 3T MRIs with 3D spoiled gradient recalled imaging sequence with fat suppression (SPGR-fs) were acquired before and one, two, five, seven and ten years after surgical treatment. Stradview v6.0 was used for semi-automatic cartilage segmentation; wxRegSurf v18 was used for surface registration. MATLAB R2020a and the SurfStat MATLAB package were used for data analysis and visualization. For changes over time, linear mixed models were used. Two separate linear regression models were used to show the influence of baseline Kellgren-Lawrence grade and sex on the changes over time. Statistical significance was calculated with statistical parametric mapping; a p-value <0.05 was considered statistically significant. Since KJD has previously shown significant results mostly in the patients' most affected compartment (MAC), patients were separated in two groups based on whether their MAC was the medial or lateral compartment.

Results: The MAC was predominantly the medial side (medial MAC n=18; lateral n=2). The 18 patients with a medial MAC all had MRI scans at baseline, one and two years after treatment. After two years, some patients were lost to follow-up, decreasing data availability at five (n=15), seven (n=11) and ten years (n=7). Figure 1 (top) shows the average cartilage thickness at the different time points for all medial MAC patients together. One and two years after treatment the cartilage in the medial weight-bearing region was on average thicker than before treatment. While from five years after treatment the cartilage thickness gradually decreased, even at ten years the medial cartilage thickness seemed slightly higher than pre-treatment. Figure 1 (bottom) shows cartilage thickness changes compared to baseline for patients with a medial MAC. Patients with a lateral MAC showed a similar pattern, with the biggest changes showing on the lateral side. As indicated by the dark blue areas, the medial femoral cartilage thickness increase, which was up to 0.5mm after one year and 0.6mm after two years, was largely statistically significant at both these time points. While the medial tibia showed an increase of up to 0.5mm at these time points as well, this was not statistically significant at two years. Surprisingly, long-term results showed areas of the lateral (less affected) compartment were significantly thicker, up to 0.7mm, compared to pre-treatment in both the femur and tibia compared to baseline. Kellgren-Lawrence grade and sex were shown to influence the changes, albeit not statistically significantly. Patients with a higher Kellgren-Lawrence grade and male sex showed a higher short-term (one and two year) but a lower long-term (seven and ten year) cartilage thickness increase.

Conclusion: KJD treatment results in significant short-term cartilage regeneration in the most affected compartment. While after two years this initial gain in cartilage thickness is gradually lost, likely as a result of natural progression, even ten years after treatment the cartilage is thicker than before treatment. In the less affected compartment, a delayed cartilage response seems to take place, with significantly increased cartilage thickness in the long term. In conclusion, in these young OA patients indicated for TKA, KJD results in femoral and tibial cartilaginous tissue regeneration both short- and long-term and in both sides of the joint.

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POS1092

SUBCHONDRAL BONE NORMALIZATION AFTER KNEE JOINT DISTRACTION TREATMENT AS MEASURED WITH CT

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Background: In addition to cartilage degeneration, knee osteoarthritis (OA) causes bone changes, including cortical bone thickening, subchondral bone density decrease, and bone shape changes as a result of widening and flattening condyles and osteophyte formation. Knee joint distraction (KJD) is a joint-preserving treatment for younger (<65 years) knee OA patients that has been shown to reverse OA cartilage degradation. On radiographs, KJD showed a decrease in subchondral bone density and an increase in osteophyte formation. However, these bone changes have never been evaluated with a 3D imaging technique.

Objectives: To evaluate cortical bone thickness, subchondral trabecular bone density, and bone shape on CT scans before and one year after KJD treatment.

Methods: 19 KJD patients were included in an extended imaging protocol, undergoing a CT scan before and one year after KJD treatment. Stradview v6.0 was used for semi-automatic tibia and femur segmentation from axial thin-slice

(0.45mm) CT scans. Cortical bone thickness (mm) and trabecular bone density (Hounsfield units, HU) were measured with an automated algorithm. Osteophytes were excluded. Afterwards, wxRegSurf v18 was used for surface registration. Registration data was used for bone shape measurements. MATLAB R2020a and the SurfStat MATLAB package were used for data analysis and visualization. Two-tailed F-tests were used to calculate changes over time. Two separate linear regression models were used to show the influence of baseline Kellgren-Lawrence grade and sex on the changes over time. Statistical significance was calculated with statistical parametric mapping; a p-value <0.05 was considered statistically significant. Bone shape changes were explored visually using vertex by vertex displacements between baseline and follow-up. Patients were separated into two groups based on whether their most affected compartment (MAC) was medial or lateral. Only patients with axial CT scans at both time points available for analysis were included for evaluation.

Results: 3 Patients did not have complete CTs and in 1 patient the imaged femur was too short, leaving 16 patients for tibial analyses and 15 patients for femoral analyses. The MAC was predominantly the medial side (medial MAC n=14; lateral n=2). Before treatment, the MAC cortical bone was compared to the rest of the joint (Figure 1). One year after treatment, MAC cortical thickness decreased, although this decrease of up to approximately 0.25mm was not statistically significant. The trabecular bone density was also higher before treatment in the MAC, and a decrease was seen throughout the entire joint, although statistically significant only for small areas on mostly the MAC where this decrease was up to approximately 80 HU (Figure 1). Female patients and patients with a higher Kellgren-Lawrence grade showed a somewhat larger decrease in cortical bone thickness. Trabecular density decreased less for patients with a higher Kellgren-Lawrence grade, and female patients showed a higher density decrease inferiorly while male patients showed a higher decrease exteriorly. None of this was statistically significant. The central areas of both compartments showed an outward shape change, while the outer ring showed inward changes.

Conclusion: MAC cortical bone thickness shows a partial decrease after KJD. Trabecular bone density decreased on both sides of the joint, likely as a direct result of the bicompartamental unloading. For both subchondral bone parameters, MAC values became more similar to the LAC, indicating (partial) subchondral bone normalization in the most affected parts of the joint. The bone shape changes may indicate a reversal of typical OA changes, although the inward difference that was seen on the outer edges may be a result of osteophyte-related changes that might have affected the bone segmentation. In conclusion, KJD treatment shows subchondral bone normalization in the first year after treatment,

and longer follow-up might show whether these changes are a temporary result of joint unloading or indicate more prolonged bone changes.

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POS1093

KNEE AND HIP OSTEOARTHRITIS ARE ASSOCIATED WITH SUBCLINICAL AND MANIFEST ATHEROSCLEROSIS: A SYSTEMATIC REVIEW AND META-ANALYSIS

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Background: An association between osteoarthritis (OA) and atherosclerosis (AT) has long been suggested, with its plausibility based on several guessed commonalities, from shared risk factors to overlapping molecular pathways, given that both conditions represent a state of chronic low-grade inflammation. However, meta-analyses of the impact of OA on hard cardiovascular (CV) endpoints have displayed conflicting results. Those disparate results probably stemmed from the heterogeneous OA population adjoined, as it has been postulated that OA denotes not a single, but a group of diseases with particular pathogenic mechanisms. Also, CV mortality may capture just the extreme of a continuum of atheromatous burden, and miss earlier subclinical disease.

Objectives: In order to discern a more refined association between OA and AT, a systematic review and a meta-analysis of studies that focused on OA of weight-bearing joints (i.e., hip and knee) were performed, and the results stratified by clinical and subclinical AT.

Methods: A search on PubMed, Web of Science, LILACS, and SciELO from inception until August 2020, was done using the MeSH search terms "osteoarthritis", "aorta", "carotid", "intima-media thickness", "coronary artery disease", "atherosclerosis", "cardiovascular disease", and "death". To appraise the quality of the studies, we applied the Newcastle-Ottawa scale. To assess for heterogeneity, I^2 was used. A random-fixed effect model was adopted, and outliers were excluded when detected. Publication bias was ascertained qualitatively by funnel plot, and quantitatively by Egger regression test. Analyses were performed on RStudio version 1.3.1093.

Results: The search retrieved 1335 citations, of which 168 were screened for abstract reading. From those, 127 were selected for full-text reading. After exclusion of duplicates and out of scope articles, a total of 23 studies, comprising 151,187 individuals with OA and 287,444 controls, were included on the narrative synthesis, and 17 on the meta-analysis. All but one study were deemed as of fair or good quality. Fifteen studies found a positive association between OA and AT, the remaining 8 did not reach statistical significance. Four studies subdivided the OA patients by gender, and in half of those a positive association was found exclusively on females. Thirteen studies worked with a subclinical definition of AT, 1 included both subclinical and manifest disease, and the remainder included only manifest disease. Hip and knee OA increased the risk for both subclinical AT (OR 1.15, 95% CI 1.01-1.31, Figure 1A), and CV disease (OR 1.13, 95% CI 1.05-1.22, Figure 1B), but not for CV death (OR 1.08, 95% CI 0.99-1.19).

Conclusion: Hip and knee OA are associated with AT. This may have practical implications on the management of OA patients, as a more intensive control of traditional CV risk factors may be advised.

Figure 1. Forest plots showcasing the association between hip and knee OA and subclinical AT (A) and CV disease (B).

Cortical bone thickness

Trabecular bone density

Figure 1: The average cortical bone thickness (top) and trabecular bone density (bottom) of all patients whose medial compartment was the most affected at baseline (left) and one year after treatment with knee joint distraction (mid). On the right a difference map between the two time points is shown; blue indicates an increase and red a decrease. Statistically significant changes are indicated by the darker color map ($p < 0.05$) while non-significant areas are shown with faded colors ($p > 0.05$). The trabecular bone density; the cortical bone thickness did not show statistically significant differences.