and without a history of depression, anxiety or insomnia ranged between 0 - 0.34 for WOMAC Pain and Physical Function and 0 - 0.19 for PGA-OA.

Conclusion: Patients with a history of depression, anxiety, or insomnia did not appear to experience dampened improvements in pain or function with tanezumab or NSAID, as compared to those without.

REFERENCES:

- [1] Schnitzer T, et al. JAMA. 2019;322(1):37-48;
- [2] Berenbaum F, et al. Ann Rheum Dis. 2020;79(6):800-10;
- [3] Schnitzer T, et al. Semin Arthritis Rheum. 2020;50(3):387-93;
- [4] Hochberg M, et al. Arthritis Rheumatol. In Press;
- [5] Sharma A, et al. Open Access Rheumatol. 2016;31(8):103-13;
- [6] Mallen C, et al. PLoS Med. 2017;14(4):e1002273;
- [7] Campbell C, et al. Arthritis Care Res. 2015;67(10):1387-96.

Acknowledgements: Study sponsored by Pfizer and Eli Lilly and Company. Editorial support was provided by Jennifer Bodkin of Engage Scientific Solutions and funded by Pfizer and Eli Lilly and Company.

Disclosure of Interests: Philip J Mease Speakers bureau: AbbVie, Amgen, Bristol Myers Squibb, Celgene, Janssen, Eli Lilly and Company, Novartis, Pfizer, UCB, Consultant of: AbbVie, Amgen, Boehringer Ingelheim, Bristol Myers Squibb, Celgene, Galapagos, Gilead, GlaxoSmithKline, Janssen, Eli Lilly and Company, Novartis, Pfizer, Sun, UCB, Grant/research support from: AbbVie, Amgen, Bristol Myers Squibb, Celgene, Janssen, Eli Lilly and Company, Novartis, Pfizer, Sun, UCB, Theresa Mallick-Searle Speakers bureau: Allergan, Abbvie, Eli Lilly and Company, Salix, Consultant of: Pfizer, Eli Lilly and Company, Elizabeth Johnston Shareholder of: Eli Lilly and Company, Employee of: Eli Lilly and Company, Lars Viktrup Shareholder of: Eli Lilly and Company, Employee of: Eli Lilly and Company, Dominique Menuet Employee of: Pfizer, Ruoyong Yang Employee of: Pfizer, Robert J Fountaine Shareholder of: Pfizer, Employee of: Pfizer.

DOI: 10.1136/annrheumdis-2021-eular.166

POS1089

ASSOCIATION BETWEEN PAIN SEVERITY AND HEALTHCARE UTILIZATION IN AN OSTEOARTHRITIS POPULATION: AN 18-YEAR RETROSPECTIVE COHORT STUDY

J. Graham¹, T. Novosot², H. Sun³, B. Piper^{1,4}, J. Boscarino⁵, V. Duboski¹, M. Kern¹, E. Wright¹, R. Robinson⁶, E. Casey⁷, C. Beck⁷, J. Hall⁸, P. Schepman⁹. ¹Geisinger, Center for Pharmacy Innovation and Outcomes, Danville, United States of America; ²Geisinger, Interventional Pain, Danville, United States of America; ³Geisinger, Biostatistics Core, Danville, United States of America; ⁴Geisinger Commonwealth School of Medicine, Department of Medical Education, Scranton, United States of America; ⁵Geisinger, Department of Population Health Sciences, Danville, United States of America; ⁶Eli Lilly & Co., Lilly Research Labs, Indianapolis, United States of America; ⁷Pfizer, Inc., Global Medical Affairs, New York, United States of America; ⁸Eli Lilly & Co., Global/US Medical Affairs, Indianapolis, United States of America; ⁹Pfizer, Inc., Global HEOR, New York, United States of America

Background: Osteoarthritis (OA) is a common disease that varies in severity among patients. A standardized definition to classify patients into different severity levels is lacking, however, due to the disease's complex pathogenesis and presentation. Prior studies have shown associations between pain severity and higher healthcare resource utilization (HRU) and costs. We investigated an association between pain severity and higher healthcare resource utilization by examining the use of specific OA-related treatments across pain intensity levels in a large, integrated health system's OA population over an 18-year period.

Objectives: Our aim was to compare use of medications and other treatments among OA patients experiencing mild, moderate, or severe pain.

Methods: This was a retrospective study of electronic health records from 2001 to 2018 at Geisinger, an integrated health system in Pennsylvania. Patients were included with a diagnosis code for OA (ICD-9: 715.*, ICD-10 M15-19) on a problem list or encounter or an OA-specific procedure (hip or knee replacement, arthroscopy or injection). We examined pain scores (0-10 scale, with 10 being worst pain) taken after the first OA diagnosis date and defined pain episodes starting on the pain score's date and lasting for 90 days. If a new pain score was measured before 90 days elapsed, the episode was extended for an additional 90 days, with this process repeated as necessary. Each episode was categorized as mild (pain score 0-3), moderate (4-6), or severe (7-10) based on initial score, and patients could contribute multiple episodes to the analysis. Descriptive statistics were used to quantify treatment utilization during each patients' mild, moderate and severe episodes. Percentages of patients who had any use of 10 medication types (tramadol, non-tramadol opioids, nonsteroidal anti-inflammatory drugs (NSAIDs), injectable corticosteroids, acetaminophen, salicylates, duloxetine, homeopathic medications, other topical medications, and other over-the-counter (OTC) medications were compared across pain episode types. Percentages of patients with knee or hip surgeries, spine or joint imaging procedures (x-ray, computed tomography or magnetic resonance) and consults to OA-related care (pain management, orthopedics or physical medicine and

rehabilitation) were also compared. All analyses used logistic regression with p-values <0.05 considered significant.

Results: We identified 290,897 patients with OA, representing 34% of the health system population in 2018; 58% were female with mean age of 49 years and mean BMI of 30.5kg/m². A total of 801,144 pain episodes were defined, with 75% of patients having at least one pain score. The two most frequently occurring pain scores were 0 (17%) and 5 (13%), and pain episodes were classified as 43% mild, 32% moderate and 25% severe. Significantly higher percentages of patients used certain medication types (NSAIDs, injectable corticosteroids, non-tramadol opioid, duloxetine) in both moderate and severe pain episodes as compared to mild episodes, but other medication types were less likely to be used as pain severity increased (acetaminophen, salicylates, homeopathic medications, other OTC medications). Knee or hip surgeries, imaging, and consults to OA-related specialists were all consistently significantly more likely to occur in patients during moderate or severe pain episodes versus mild episodes (relative risk ratios of 1.76, 1.25 and 1.35 for moderate vs mild, respectively, and 2.00, 1.44 and 1.46 for severe vs mild, all p-values <0.05).

Conclusion: While pain is generally recognized to be a subjective measure that could be influenced by other unmeasured factors and can be confounded with treatment effectiveness, it is nevertheless the primary symptom of OA. It is important to understand the relationship between pain intensity and treatment utilization, and our results support an overall association between pain and utilization but provide new details on the extent to which it depends on specific utilization type.

Acknowledgements: Pfizer and Eli Lilly and Company for sponsoring this study.

Disclosure of Interests: Jove Graham Grant/research support from: I am an employee of Geisinger which received financial support from Pfizer and Eli Lilly and Company in connection with the development of this abstract, Tonia Novosot Grant/research support from: I am an employee of Geisinger which received financial support from Pfizer and Eli Lilly and Company in connection with the development of this abstract, Haiyan Sun Grant/research support from: I am an employee of Geisinger which received financial support from Pfizer and Eli Lilly and Company in connection with the development of this abstract, Joseph Boscarino Grant/research support from: I am an employee of Geisinger which received financial support from Pfizer and Eli Lilly and Company in connection with the development of this abstract, Brian Piper Grant/research support from: I am an employee of Geisinger which received financial support from Pfizer and Eli Lilly and Company in connection with the development of this abstract, Vanessa Duboski Grant/research support from: I am an employee of Geisinger which received financial support from Pfizer and Eli Lilly and Company in connection with the development of this abstract, Melissa Kern Grant/research support from: I am an employee of Geisinger which received financial support from Pfizer and Eli Lilly and Company in connection with the development of this abstract, Eric Wright Grant/research support from: I am an employee of Geisinger which received financial support from Pfizer and Eli Lilly and Company in connection with the development of this abstract, Rebecca Robinson Shareholder of: Eli Lilly & Co., Employee of: Eli Lilly & Co., Edward Casey Shareholder of: Pfizer, Inc., Paid instructor for: As an employee of Pfizer, Inc. this is part of my role., Employee of: Pfizer, Inc., Craig Beck Shareholder of: Pfizer, Inc., Employee of: Pfizer, Inc., Jerry Hall Shareholder of: Eli Lilly & Co., Employee of: Eli Lilly & Co., Patricia Schepman Shareholder of: Pfizer, Inc., Employee of: Pfizer, Inc.

DOI: 10.1136/annrheumdis-2021-eular.523

POS1090

ASSOCIATION BETWEEN ANTIBIOTIC USE AND KNEE PAIN AND FUNCTION IN OA: DATA FROM THE OSTEOARTHRITIS INITIATIVE

I. Shirinsky¹, V. Zagainova², V. Shirinsky¹. ¹Research Institute of Fundamental and Clinical Immunology, Laboratory of Clinical Immunopharmacology, Novosibirsk, Russian Federation; ²Research Institute of Fundamental and Clinical Immunology, Rheumatology Unit, Novosibirsk, Russian Federation

Background: Recently, gut dysbiosis has been linked with joint pain in osteoarthritis (OA) (1). Thus, it can be hypothesized that antibiotic use impacts symptoms of OA. To date, there have been no studies assessing association between the intake of antibiotics and clinical manifestations of knee OA.

Objectives: To evaluate association between the use of antibiotics and OA-related knee pain and function.

Methods: For the current study we used 4-year longitudinal data obtained from the Osteoarthritis Initiative (OAI) progression (n= 1390) and incidence (n = 3284) subcohorts, which are publically available at <https://oai.nih.gov>. The outcome variables studied were Western Ontario McMaster Osteoarthritis Index (WOMAC) pain and function subscales. To acquire information about the use of antibiotics, a medication inventory method was used. We excluded participants who used antibiotics at or 30 days prior to baseline (a "new-user" design). Antibiotic users were defined as those with at least one recorded use during first four years of the study. The participants were matched into antibiotic users/non-users pairs using genetic matching based on various demographic and clinical characteristics. The outcomes were assessed at baseline and annually until year 4. Generalized

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>

Disclosure of Interests: None declared.

DOI: 10.1136/annrheumdis-2021-eular.963

POS1091 KNEE JOINT DISTRACTION RESULTS IN MRI CARTILAGE THICKNESS INCREASE UP TO TEN YEARS AFTER TREATMENT

M. Jansen¹, S. Mastbergen¹, T. D. Turmezei^{2,3}, J. W. Mackay^{3,4}, F. Lafeber¹.
¹UMC Utrecht, Department of Rheumatology & Clinical Immunology, Utrecht, Netherlands; ²Norfolk & Norwich University Hospital, Department of Radiology, Norwich, United Kingdom; ³University of East Anglia, Norwich Medical School, Norwich, United Kingdom; ⁴University of Cambridge, Department of Radiology, Cambridge, United Kingdom

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.

Disclosure of Interests: None declared.

DOI: 10.1136/annrheumdis-2021-eular.1321

POS1092 SUBCHONDRAL BONE NORMALIZATION AFTER KNEE JOINT DISTRACTION TREATMENT AS MEASURED WITH CT

M. Jansen¹, A. Ooms¹, T. D. Turmezei^{2,3}, J. W. Mackay^{3,4}, S. Mastbergen¹, F. Lafeber¹.
¹UMC Utrecht, Department of Rheumatology & Clinical Immunology, Utrecht, Netherlands; ²Norfolk & Norwich University Hospital, Department of Radiology, Norwich, United Kingdom; ³University of East Anglia, Norwich Medical School, Norwich, United Kingdom; ⁴University of Cambridge, Department of Radiology, Cambridge, United Kingdom

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