disease is active – making the films useful as a baseline but not much help in getting a timely diagnosis and treatment. Modern imaging techniques, including ultrasound and magnetic resonance imaging (MRI), which can reveal early, non-bony signs of RA that are invisible on X-ray

Objectives: To conduct a comparative analysis of the possibility of MRI in RA patients in the early diagnosis of the disease with the data X-ray of hands and feet

Methods: The study included 56 patients with a reliable diagnosis of RA aged from 17 to 66 years, with disease duration from 4 months to 1 year. Verification of the diagnosis of RA was carried out in accordance with the diagnostic APA criteria (1987). The criteria for the selection of patients was the presence of disease activity. Patients were mainly with the II degree of disease activity. All patients underwent radiography of the small joints of the hands and feet, and 28 patients underwent MRI with dominant hands

Results: The study showed certain changes in the structures of the joint based on MRI in the early stages of RA. So, according to MRI of the brushes, it was revealed: thickening of the synovial membrane - in 23 (86%) patients; marginal erosion and subchondral cysts - in 21 (75%) patients; bone erosions - in 25 (90%) patients; phenomena of destruction of the articular cartilage (thinning, ulceration and destruction) - in 16 (57%) patients; effusion to the joints - in 19 (68%) patients and tenosynovitis - in 18 (64%) patients. In turn, the radiological data of the hands and feet showed that erosive arthritis was found in 23 (41%) patients and marginal erosions - in 22 (39%) patients

Conclusion: Thus, MRI of the hands plays an important role in the early diagnosis of RA, since it allows visualizing the characteristic changes in all joint structures in RA. MRI is a highly effective diagnostic method in diagnosis of RA, which in combination with other methods of research helps to establish the diagnosis at an early stage diseases and timely appointment of adequate basic treatment unlike radiography

REFERENCES:

- [1] Klarlund M, Ostergaard M, Jensen KE, Madsen JL, Skjodt H, Lorenzen I. Magnetic resonance imaging, radiography, and scintigraphy of the finger joints: one year follow up of patients with early arthritis—the TIRA group. *Ann Rheum Dis* 2000; 59:521–528
- [2] McQueen FM, Stewart N, Crabbe J, et al. Magnetic resonance imaging of the wrist in early rheumatoid arthritis reveals a high prevalence of erosions at four months after symptom onset. *Ann Rheum Dis* 1998; 57:350–356

Disclosure of Interests: None declared

DOI: 10.1136/annrheumdis-2019-eular.2067

THU0619

THE VALUE OF MORPHOLOGICAL AND BIOCHEMICAL MAGNETIC RESONANCE IMAGING (MRI) OF RADIOCARPAL CARTILAGE FOR THE DIFFERENTIATION OF RHEUMATOID ARTHRITIS AND OSTEOARTHRITIS

Philipp Sewerin, Lino Sawicki, Christoph Schleich, Daniel Abrar, Matthias Schneider, Stefan Vordenbäumen, Benedikt Ostendorf. *Universitätsklinikum Düsseldorf, Düsseldorf, Germany*

Background: Using high-field MRI to differ morphologically between OA and RA.

Objectives: To evaluate the value of morphological and biochemical, contrast-agent free high-field (3 Tesla) MRI of the radiocarpal cartilage to differ between osteoarthritis (OA) and rheumatoid arthritis (RA).

Methods: The group consisted of 47 subjects, who were examined during the period from October 2016 to December 2017. The clinical dominant hand of 11 patients suffering from early rheumatoid arthritis (RA) (German ArthroMark cohort, Ø 52.8years; min: 32; max 74), seropositive (ACPA and/or RF), disease duration < 6 months (range 2–23 weeks)), 10 with osteoarthritis (OA) (Ø 48.55 ± 15.23 years, min: 34 years, max: 68 years, disease duration Ø 6 years ± 8.29) and 26 healthy volunteers (Ø 46.55 ± 17.55 years, min: 20 years, max: 79 years) were examined with a 3T MRI scanner, prospectively. Morphological and biochemical assessment of radiocarpal cartilage was performed using DESS, TrueFISP and T2* images.

Results: Morphological sequences demonstrated significantly higher cartilage damage in RA and OA compared to healthy controls (DESS: $p = 0.01$, $p = 0.0004$; TrueFISP: $p = 0.02$, $p = 0.0001$), while there was no significant difference between RA and OA patients. With biochemical MRI using T2* imaging, patients with OA showed higher cartilage integrity compared to patients with RA ($p = 0.01$).

Conclusion: Morphological and biochemical MRI of radiocarpal cartilage could be helpful to differentiate between RA and OA patients. Both, RA and OA, are associated with cartilage damage measured by morphological MRI of the hand. Hence, OA was associated with more loss of cartilage integrity compared to RA using biochemical MRI, whereby only early RA patients were analyzed in this first evaluation. Non-contrast-agent morphological and biochemical MRI could be a non-invasive tool to investigate cartilage integrity in RA and OA patients and could help to differ disease pattern in the future.

Acknowledgement: We would like to thank Erika Rädtsch for the assistance in receiving the MRI scans.

Disclosure of Interests: Philipp Sewerin: None declared, Lino Sawicki: None declared, Christoph Schleich: None declared, Daniel Abrar: None declared, Matthias Schneider Grant/research support from: GlaxoSmithKline and UCB Pharma for performing the LuLa-study., Speakers bureau: Chugai, Stefan Vordenbäumen: None declared, Benedikt Ostendorf: None declared

DOI: 10.1136/annrheumdis-2019-eular.4831

THU0620

THE PHYSIOLOGICAL FINGER JOINT ARCHITECTURE – AGE-RELATED INCREASE OF EROSIONS AND OSTEOPHYTES IN THE JOINTS OF HEALTHY INDIVIDUALS

David Simon¹, Andreas Berlin^{1,2}, Koray Tascilar¹, Sara Bayat¹, Klaus Engelke¹, Jürgen Rech¹, Camille Figuereido^{1,3}, Axel Hueber^{1,4}, Georg Schett¹, Amd Kleyer¹. ¹Friedrich-Alexander University Erlangen-Nuremberg (FAU) and Universitätsklinikum Erlangen, Department of Internal Medicine 3, Rheumatology and Immunology, Erlangen, Germany; ²University Hospital Würzburg, Würzburg, Germany; ³School of Medicine from São Paulo University (FMUSP), Sao Paulo, Brazil; ⁴Klinikum Bamberg, Bamberg, Germany

Background: The “normal” finger joint architecture has not yet been defined and could change in the course of life. Therefore the objective was to assess the physiological finger joint architecture of healthy individuals and the relation of structural changes to age and sex.

Objectives: Therefore the objective was to assess the physiological finger joint architecture of healthy individuals and the relation of structural changes to age and sex using high-resolution quantitative computed tomography (HR-pQCT) of the hands.

Methods: Healthy individuals without rheumatic diseases and other comorbidities were recruited through a field campaign and received HR-pQCT examination of the Metacarpophalangeal 2/3 and Proximal Interphalangeal 2/3 joints of one hand. The number of erosions and osteophytes was quantified across different sexes and age decades (6 decades within the age range of 21-80 years).^{1,2,3}

Results: 120 healthy individuals (10 women and 10 men in each decade) were recruited. Bone erosions [median (Q1-Q3), 1 (0-2)] and osteophytes [2 (1-4)] were found in both sexes without significant differences. However, structural changes increased with age: the overall incidence rate ratio (IRR) for the number of erosions and osteophytes per age were 1.04 (95% CI 1.03-1.06; 95% CI 1.03-1.05), which indicates a 4% increase in the number of erosions and osteophytes per year. The use of the 3rd decade as the reference demonstrated that healthy individuals in the age decades from 50 years had higher IRR for erosion number (6th, 7th, 8th decade: 4.87 (2.20-11.75), 6.81 (3.08-16.46) and 6.92 (3.11-16.79)) compared to younger subjects (4th, 5th decade: 1.80 (0.69-4.87), 1.53 (0.59-4.10)). The IRRs of osteophytes also indicate a progressive increase after the fifth decade, with IRRs of 2.32 (1.32-4.17), 4.17 (2.38-7.49) and 6.86 (3.97-12.20) for the 6th, 7th and 8th decades, respectively.

Conclusion: Structural changes in the finger joints of healthy individuals are age-related. While being rare under 50 years of age, erosions and osteophytes accumulate above the age of 50, suggesting that the threshold between “normal” and “pathological” shifts with increasing age.

REFERENCES:

- [1] Simon D, Kleyer A, Stemmler, et al. Age- and Sex-Dependent Changes of Intra-articular Cortical and Trabecular Bone Structure and the Effects of Rheumatoid Arthritis. *J Bone Miner Res*. 2017 Apr
- [2] Figuereido CP, Simon D, Englbrecht M, et al. Quantification and Impact of Secondary Osteoarthritis in Patients With Anti-Citrullinated Protein Antibody-Positive Rheumatoid Arthritis. *Arthritis Rheumatol*. 2016 Sep
- [3] Figuereido CP, Kleyer A, Simon D, et al. Methods for segmentation of rheumatoid arthritis bone erosions in high-resolution peripheral quantitative computed tomography (HR-pQCT). *Semin Arthritis Rheum*. 2018 Apr;

Disclosure of Interests: David Simon Grant/research support from: Novartis, Consultant for: Lilly, Speakers bureau: Janssen, Andreas Berlin: None declared, Koray Tascilar: None declared, Sara Bayat: None declared, Klaus Engelke: None declared, Jürgen Rech Grant/research support from: Bristol-Myers Squibb and Celgene (greater than \$10,000), Consultant for: Bristol-Myers Squibb, Celgene, Chugai, GlaxoSmithKline, Janssen, Eli Lilly, Novartis, Roche, Sanofi Aventis, and UCB (in total more than \$10,000), Speakers bureau: Bristol-Myers Squibb, Celgene, Chugai, GlaxoSmithKline, Janssen, Eli Lilly, Novartis, Roche, Sanofi Aventis, and UCB (in total more than \$10,000), Camille Figueredo: None declared, Axel Hueber Grant/research support from: Novartis, Pfizer, Lilly, Consultant for: Lilly, GSK, Novartis, Janssen, Celgene, Abbvie, Roche, Speakers bureau: Lilly, Janssen, Novartis, Celgene, Biogen, Abbvie, BMS, Georg Schett: None declared, Arnd Kleyer Grant/research support from: Lilly, Consultant for: Lilly, Speakers bureau: Abbvie

DOI: 10.1136/annrheumdis-2019-eular.2757

THU0621

VERY LOW PREVALENCE OF ULTRASOUND DETERMINED TENDON ABNORMALITIES IN HEALTHY SUBJECTS THROUGHOUT THE AGE RANGE: OMERACT ULTRASOUND MINIMAL DISEASE STUDY

Jeanette Trickey¹, Ilfita Sahbudin¹, Alessandra Bortoluzzi², Annamaria Iagnocco³, Carlos Pineda⁴, Cesar Sifuentes-Cantu⁵, Coziana Ciurtin⁶, Cristina Reategui Sokolova⁴, Daniela Fodor⁷, Ellen-Margrethe Hauge⁸, Esperanza Naredo⁹, Florentin Ananu Vreju⁹, Garifallia Sakellariou¹⁰, George Bruyn¹¹, Georgios Filippou², Giuliana M.C. La Paglia⁵, Gustavo Leon⁴, Helen Keen¹², Hilde Berner Hammer¹³, Ilaria Tinazzi¹⁴, Irene Azzolin³, Jacek Flicinski¹⁵, James Wilton⁶, Kei Ikeda¹⁶, Lene Terslev¹⁷, Mads Ammitzbøll-Danielsen¹⁷, Mads Nyhuus Bendix Rasch⁸, Marcin Milchert¹⁵, Maria Stoenoiu¹⁸, Marion Kortekaas¹⁹, Marwin Gutierrez⁴, Mihaela Maruseac¹⁸, Mohammed A Mortada²⁰, Philippe Carron²¹, Rositsa Karalilova²², Ruth Wittoek²¹, Sarah Ohrndorf²³, Takeshi Suzuki²⁴, Teodora Serban³, Maria-Antonietta D'agostino²⁵, Andrew Filer¹, OMERACT US Group. ¹IA, Birmingham, United Kingdom; ²UoF, Cona, Italy; ³ARC, Turin, Italy; ⁴INR, Mexico City, Mexico; ⁵UFJD, Madrid, Spain; ⁶UCL, London, United Kingdom; ⁷IHU, Cluj-Napoca, Romania; ⁸AUH, Aarhus, Denmark; ⁹UoC, Craiova, Romania; ¹⁰UoP, Pavia, Italy; ¹¹MCG, Lelystad, Netherlands; ¹²UWA, Perth, Australia; ¹³DH, Oslo, Norway; ¹⁴SCH, Verona, Italy; ¹⁵PUM, Szczecin, Poland; ¹⁶CUH, Chiba, Japan; ¹⁷CUH, Copenhagen, Denmark; ¹⁸UCLB, Brussels, Belgium; ¹⁹LUM, Leiden, Netherlands; ²⁰ZU, Zagazig, Egypt; ²¹GUH, Ghent, Belgium; ²²UHK, Plovdiv, Bulgaria; ²³CU, Berlin, Germany; ²⁴JRC, Tokyo, Japan; ²⁵APHP, Paris, France

Background: Tenosynovitis (TS) is a common, often clinically undetectable finding in Rheumatoid Arthritis (RA). Recent data showed TS on ultrasound (US) has a role in predicting outcome in early disease and flare in clinical remission. However data is limited on US measured TS in healthy subjects (HS), none specifically encompassing the older age range when RA commonly presents.

Objectives: This OMERACT study aimed to determine prevalence of US measured tendon abnormalities in HS throughout the age range.

Methods: Adult HS without: joint pain (VAS <10/100), hand osteoarthritis (ACR criteria), or inflammatory arthritis were recruited in 23 international centres from Aug 2017-Dec 2018. MCP, PIP and wrist joints were clinically examined. Bilateral digit flexor (DF) 1-5 and extensor carpi ulnaris (ECU) tendons were scanned for tenosynovial hypertrophy (TSH) and power Doppler (PD) signal and graded (OMERACT US scoring system¹). A comparison cohort of DMARD-naïve patients with RA (ACR-EULAR 2010 and/or 1987 criteria) at presentation was taken from the Birmingham Early Arthritis (BEACON) inception cohort, who underwent identical tendon US assessment. They were grouped into ≤12 and > 12 weeks from symptom onset.

Results: Data from 899 HS and 144 RA patients were included.

	HS 18-39 y	HS 40-59 y	HS ≥60 y	RA ≤12	RA > 12	5 groups p value	RA ≤12 vs >12 p value
n	408	311	180	30	114		
Age, y (IQR)	29 (25-33)	49 (44-55)	68 (62-72)	58 (52-69)	53 (42-65)	<0.001	0.03
Female (%)	270 (66)	270 (83)	114 (62)	20 (67)	86 (75)	<0.001	0.2
DAS 28 CRP (IQR)	-	-	-	5.4 (4.2-6.1)	4.8 (4.1-5.7)	-	0.1
Tender joint* (IQR)	0	0	0	18 (10-23)	17 (11-29)	<0.001	0.9
Swollen joint* (IQR)	0	0	0	8 (3-18)	6 (3-9)	<0.001	0.1

DF 1-5 TSH	8 (0.2)	9 (0.3)	2 (0.1)	54 (18)	125 (11)	<0.001	0.06
gd ≥1 (%)							
DF 1-5 PD gd	3 (0.05)	2 (0.06)	0	49 (16)	85 (8)	<0.001	0.02
≥1 (%)							
ECU TSH gd	1 (0.1)	11 (1.8)	5 (1.4)	13 (22)	52 (23)	<0.001	0.8
≥1 (%)							
ECU PD gd	0	0	0	12 (20)	50 (22)	<0.001	0.7
≥1 (%)							

*RA had 66/68 joint count

Prevalence of TSH and particularly PD abnormalities in HS was very low at all ages, and was all grade 1 except in one individual ECU tendon. ECU TSH grade ≥1 was more common than DF grade ≥1 in the older HS groups, and less common in the 18-39 age group (p=0.011). TSH and PD of grade ≥1 were common in RA patients, with DF PD abnormalities more common in early disease (p=0.02).

Conclusion: Low prevalence of TSH or PD abnormalities in tendons of HS even in old age suggests US determined TS will be a robust tool in clinically managing RA.

REFERENCES:

- [1] Naredo E, D'Agostino MA, et al. Reliability consensus-based US score TS RA. *ARD*.2013;72(8):1328-34

Disclosure of Interests: Jeanette Trickey: None declared, Ilfita Sahbudin: None declared, Alessandra Bortoluzzi: None declared, Annamaria Iagnocco: None declared, Carlos Pineda: None declared, Cesar Sifuentes-Cantu: None declared, Coziana Ciurtin: None declared, Cristina Reategui Sokolova: None declared, Daniela Fodor: None declared, Ellen-Margrethe Hauge: None declared, Esperanza Naredo Consultant for: Abbvie, Speakers bureau: Abbvie, Roche, Bristol-Myers Squibb, Pfizer, UCB, Lilly, Novartis, Janssen, and Celgene GmbH, Florentin Ananu Vreju Consultant for: Abbvie and Novartis, Speakers bureau: Abbvie, Novartis, Pfizer, sandoz, eli Lilly, ucb pharma, Garifallia Sakellariou: None declared, George Bruyn : None declared, Georgios Filippou Speakers bureau: Laborest, Abbvie, BMS, Sanofi, Giuliana M.C. La Paglia : None declared, Gustavo Leon: None declared, Helen Keen: None declared, Hilde Berner Hammer Grant/research support from: Abbvie, Pfizer and Roche, Paid instructor for: Abbvie, Pfizer, UCB, Novartis, Roche, Speakers bureau: Abbvie, Pfizer, UCB, Novartis, Roche, Ilaria Tinazzi: None declared, Irene Azzolin: None declared, Jacek Flicinski: None declared, James Wilton: None declared, Kei Ikeda: None declared, Lene Terslev Speakers bureau: Speakers fee from : Roche, Novartis, Pfizer, MSD, BMS, Celgene, Mads Ammitzbøll-Danielsen: None declared, Mads Nyhuus Bendix Rasch: None declared, Marcin Milchert: None declared, Maria Stoenoiu Grant/research support from: Abbvie, Roche, Wyeth, Marion Kortekaas: None declared, Marwin Gutierrez: None declared, Mihaela Maruseac: None declared, Mohammed A Mortada: None declared, Philippe Carron: None declared, Rositsa Karalilova: None declared, Ruth Wittoek: None declared, Sarah Ohrndorf: None declared, Takeshi Suzuki: None declared, Teodora Serban: None declared, Maria-Antonietta d'Agostino: None declared, Andrew Filer: None declared

DOI: 10.1136/annrheumdis-2019-eular.4746

THU0622

MRI OF THE CRANIO-CERVICAL JUNCTION IN RHEUMATOID ARTHRITIS – DEFINITION OF NORMAL AND PATHOLOGICAL FINDINGS

Katharina Ziegeler¹, Christoph Korsing², Mattias Bollow³, Kay Geert A. Hermann¹. ¹Charité – Universitätsmedizin Berlin, Radiology, Berlin, Germany; ²Elisabeth-Krankenhaus, Internal Medicine, Essen, Germany; ³Augusta-Kranken-Anstalt, Bochum, Diagnostic and Interventional Radiology and Nuclear Medicine, Bochum, Germany

Background: In rheumatoid arthritis (RA), disease involvement at the cervical spine is common and may lead to malposition of the dens axis, resulting in severe neurological impairment. To date, malalignment is mostly described by X-rays.

Objectives: The aim of this investigation was to systematically define osseous and ligamentous MRI-findings in cranio-cervical RA in comparison to a control group without the disease.

Methods: MRI datasets of patients with cranio-cervical RA were identified retrospectively from the institutional image database and matched regarding age and gender with control patients. All image datasets were systematically reviewed for: position and morphology of dens axis (including erosions and osteitis); width and angle of the cranio-cervical joints; length, angle and visibility of peridental ligaments; vascularization of peridental