

# The association between physical activity and cardiorespiratory fitness in patients with rheumatoid arthritis and high cardiovascular risk

**Author(s)**

Van den Hoek, J.; Van der Leeden, M.; Metsios, G.; Kitas, G.; Jorstad, H.; Lems, W.; Nurmohamed, M.; Van der Esch, M.

**DOI**

[10.1136/annrheumdis-2020-eular.4766](https://doi.org/10.1136/annrheumdis-2020-eular.4766)

**Publication date**

2020

**Document Version**

Final published version

**Published in**

Annals of the rheumatic diseases

[Link to publication](#)

**Citation for published version (APA):**

Van den Hoek, J., Van der Leeden, M., Metsios, G., Kitas, G., Jorstad, H., Lems, W., Nurmohamed, M., & Van der Esch, M. (2020). The association between physical activity and cardiorespiratory fitness in patients with rheumatoid arthritis and high cardiovascular risk. *Annals of the rheumatic diseases*, 79(Suppl. 1), 1949-1950. Article AB1320-HPR. <https://doi.org/10.1136/annrheumdis-2020-eular.4766>

**General rights**

It is not permitted to download or to forward/distribute the text or part of it without the consent of the author(s) and/or copyright holder(s), other than for strictly personal, individual use, unless the work is under an open content license (like Creative Commons).

**Disclaimer/Complaints regulations**

If you believe that digital publication of certain material infringes any of your rights or (privacy) interests, please let the Library know, stating your reasons. In case of a legitimate complaint, the Library will make the material inaccessible and/or remove it from the website. Please contact the library: <https://www.amsterdamuas.com/library/contact/questions>, or send a letter to: University Library (Library of the University of Amsterdam and Amsterdam University of Applied Sciences), Secretariat, Singel 425, 1012 WP Amsterdam, The Netherlands. You will be contacted as soon as possible.

period. On completion, subjects were offered to enroll into a follow-up study, where the study physicians were given flexibility to alter VNS dosing parameters and/or to add a biologic disease-modifying antirheumatic drug (DMARD) to the treatment regimen to induce disease remission. Clinical disease activity measures and safety were assessed over 4 years.

**Results:** All patients electively continued VNS treatment in the long-term follow-up study, 4 subjects withdrew prior to month 48. Reasons for discontinuation were withdrawal of consent (N=3) and adverse event due to device discomfort (N=1). At the start of the follow-up study, the mean DAS28-CRP, CDAI and HAQ-DI were significantly reduced compared to the pre-implant baseline (mean difference± SD: DAS28-CRP=-1.60± 1.13, p<0.001; CDAI=-21.19± 13.5, p<0.001; HAQ-DI=-0.44± 0.49, p<0.01), and this effect was retained through 48 months. Patients using VNS monotherapy and those using a combination of VNS with biologic DMARDs exhibited stable improvements in DAS28-CRP, CDAI and HAQ-DI at month 48 (Table 1). Improvements were observed for patients who both previously had an insufficient response to targeted biological therapies as well those who had an insufficient response to standard DMARDs. No association was seen between DAS28-CRP and stimulation frequency (Range= 1X-8X/day). There was no difference in the adverse events profile between the two groups.

**Table 1. Efficacy of VNS treatment.**

	Treatment Reinitiated N=9			VNS Monotherapy N=8			Total N=17		
	Mo. 24	Mo. 36	Mo. 48	Mo. 24	Mo. 36	Mo. 48	Mo. 24	Mo. 36	Mo. 48
	Mean change from baseline (SD)								
DAS28-CRP	-2.58 (1.0)***	-2.40 (1.0)**	-2.28 (1.3)**	-2.61 (1.3)*	-1.77 (1.8)	-2.0 (1.7)	-2.59 (1.1)***	-2.19 (1.2)**	-2.17 (1.4)**
CDAI	-24.06 (8.3)***	-18.02 (13.3)*	-16.2 (19.6)	-33.5 (11.1)***	-27.8 (16.0)*	-27.9 (12.7)*	-28.20 (10.5)***	-21.93 (14.5)*	-20.83 (17.5)*
HAQ-DI	-0.60 (0.64)*	-0.63 (0.45)*	-0.31 (0.60)	-0.89 (0.69)*	-0.88 (0.92)	-0.88 (0.61)	-0.73 (0.66)***	-0.73 (0.64)**	-0.54 (0.64)*

\*P<0.05, \*\*P<0.01, \*\*\*P<0.001 versus primary study baseline (month -3.5)

**Conclusion:** VNS was safe, well-tolerated, and resulted in significant and clinically important improvements in disease activity measures that were maintained over 48 months. These results support development of VNS devices as a new therapeutic option for RA treatment.

#### References:

- [1] van Maanen MA, et al. *Nat Rev Rheum* 2009
- [2] Koopman FA, et al. *PNAS* 2016
- [3] Koopman FA, et al. *Arthritis Rheum* 2018

**Disclosure of Interests:** Frieda Koopman: None declared, Anne Musters: None declared, Marieke Backer: None declared, Danielle Gerlag Shareholder of: GlaxoSmithKline, Employee of: GlaxoSmithKline, Sanda Miljko: None declared, Simeon Grazio Speakers bureau: Abbvie, Roche, MSD, Eli Lilly, Pfizer, Mylan, Amgen, Fresenius Kabi, Stada, Berlin-Chemie, Sekib Sokolovic: None declared, Yaakov Levine Shareholder of: SetPoint Medical, Employee of: SetPoint Medical, Emmett Glass Employee of: SetPoint Medical, David Chernoff Shareholder of: SetPoint Medical, Adamas Pharmaceuticals, Olly Nutrition, NAIA Pharma, Aquinox Pharma, Consultant of: Adamas Pharmaceuticals, Olly Nutrition, NAIA Pharma, Aquinox Pharma, Crescendo Bioscience, Employee of: SetPoint Medical, Niek de Vries Grant/research support from: AbbVie, Janssen, Ergomed Clinical Research, GlaxoSmithKline, Pfizer, Boehringer Ingelheim, Roche, Consultant of: MSD, Pfizer, Paul P. Tak Shareholder of: GlaxoSmithKline, Employee of: GlaxoSmithKline  
DOI: 10.1136/annrheumdis-2020-eular.2914

#### AB1319-HPR EFFECT OF SEGMENTAL STABILIZATION AND PILATES ON CHRONIC NON-SPECIFIC LOW BACK PAIN: PILOT STUDY

A. Torres Cruz<sup>1</sup>, P. De Oliveira Januário<sup>1</sup>, I. Coelho Baptista<sup>2</sup>, A. Da Rocha Rodrigues<sup>2</sup>, C. H. Chagas Bernardo<sup>2</sup>, T. Silva Nunes<sup>2</sup>, M. Antunes<sup>1</sup>, I. Merllin Batista de Souza<sup>1</sup>, A. Pasqual Marques<sup>1</sup>. <sup>1</sup>Universidade de São Paulo, Department of Physical Therapy Speech Therapy and Occupational Therapy, São Paulo, Brazil; <sup>2</sup>Centro Universitário de Barra Mansa, Department of Physical Therapy, Barra Mansa, Brazil

**Background:** Low back pain is an important health condition with major socio-economic consequences and is associated with high costs for the health system, absenteeism at work and reduced functional performance. It is one of the most relevant health problems in the elderly, with point prevalence estimates higher than other musculoskeletal conditions.

**Objectives:** To verify the effect of segmental stabilization versus the Pilates method in the elderly with chronic low back pain.

**Methods:** The study included 9 elderly women with chronic low back pain randomized into two groups: Segmental Stabilization Group (SG n = 5; age 65.2 ± 4.32; Body Mass Index - BMI 29.99 ± 4.65) and Pilates Group (PG n = 4; age 67.75 ± 7.13; BMI 26.49 ± 4.06). Both groups underwent 16 individual sessions of 60 minutes twice a week and avaliated before and after 8 weeks. Pain was assessed using the Visual Analogue Pain Scale; functional disability, by Oswestry's disability index; excessive fear of movement and physical activity, using the Tampa Kinesiophobia Scale; level of confidence in the balance for specific activities, on the Activity-Specific Balance Confidence (ABC) scale and; activation of the transverse muscle of the abdomen, by the pressure biofeedback unit Stabilizer of the Chatanooga brand. The allocation and evaluations of the participants were performed by a blind examiner. The data were analyzed using the Student's t-test with the level of significance (p≤0.05).

**Results:** The data show significant differences in the reduction of pain intensity (p= 0.022) and functional disability (p=0.023) only in SG and improvement in kinesiophobia (p=0.007) only in PG. The level of confidence in the balance for specific activities was better in the SG when compared to the PG (p=0.059). There was no difference in the activation of the transversus abdominis in both groups.

**Conclusion:** The results indicate that the segmental stabilization was effective to improve pain and functional disability, Pilates to improve the degree of kinesiophobia and the SG obtained a better result when compared to the PG regarding the level of confidence in the balance for specific activities. Both techniques had a great effect on improving functional capacity and on the level of confidence in the balance for specific activities. It is suggested to carry out studies with a larger number of participants and follow-up evaluation to assess the long-term effects.

#### References:

- [1] Boonstra AM, Preuper HRS, Reneman MF, Posthumus JB, Stewart RE. Reliability and validity of the visual analogue scale for disability in patients with chronic musculoskeletal pain. *IJSR* 2008; 3(2):165-9.
- [2] Marques AP, Mendes YC, Taddei U, Pereira CAB, Assumpção A. Brazilian-Portuguese translation and cross cultural adaptation of the activities-specific balance confidence ABC scale. *Braz J Phys Ther* 2013; 17(2): 170-8.
- [3] Siqueira FB, Teixeira-Salmela LF, Magalhães LC. Análise das propriedades psicométricas da versão brasileira da escala tampa de cinesiofobia. *Acta Orto Bras* 2007; 15(1): 19-24.
- [4] Viggato R, Alexandre NMC, Correa Filho HR. Development of a Brazilian Portuguese version of the Oswestry Disability Index: cross-cultural adaptation, reliability, and validity. *Spine* 2007; 32(4):481-6.

**Acknowledgments:** Coordenação de Aperfeiçoamento de Pessoal de Nível Superior (CAPES)

**Disclosure of Interests:** None declared

**DOI:** 10.1136/annrheumdis-2020-eular.3371

#### AB1320-HPR THE ASSOCIATION BETWEEN PHYSICAL ACTIVITY AND CARDIORESPIRATORY FITNESS IN PATIENTS WITH RHEUMATOID ARTHRITIS AND HIGH CARDIOVASCULAR RISK

J. Van den Hoek<sup>1</sup>, M. Van der Leeden<sup>2</sup>, G. Metsios<sup>3</sup>, G. Kitas<sup>4</sup>, H. Jorstad<sup>2</sup>, W. Lems<sup>2</sup>, M. Nurmohamed<sup>2</sup>, M. Van der Esch<sup>5</sup>. <sup>1</sup>Amsterdam Rehabilitation Research Center | Reade, Amsterdam, Netherlands; <sup>2</sup>Amsterdam University Medical Centers, Amsterdam, Netherlands; <sup>3</sup>University of Wolverhampton, West Midlands, United Kingdom; <sup>4</sup>Russel's Hall Hospital, West Midlands, United Kingdom; <sup>5</sup>Amsterdam Rehabilitation Research Center | Reade, Amsterdam, Netherlands

**Background:** Rheumatoid arthritis (RA) is associated with increased risk of cardiovascular disease (CVD) disease and CV mortality<sup>1</sup>. High values of cardiorespiratory fitness (CRF) are protective against CVD and CV mortality<sup>2</sup>. Physical activity levels in patients with RA are low. Knowledge on whether physical activity is associated with CRF in patients with RA and high CV risk is scarce. This knowledge is important because improving the level of physical activity could improve CRF and lower CV risk in this group of patients with RA and high CV risk. However, it is unclear whether physical activity is associated with CRF in this group of patients. This study presents the preliminary results at baseline of the association of physical activity with CRF from an ongoing pilot study aimed at improving CRF through exercise therapy in patients with RA and high CV risk.

**Objectives:** To determine (i) the level of physical activity in patients with RA and high CV risk and (ii) whether physical activity is associated with CRF in patients with RA and high CV risk.

**Methods:** Patients with RA and high CV risk participated in this pilot study. Increased 10-year risk of CV mortality was determined by using the Dutch SCORE-table. Anthropometrics and disease characteristics were collected. Physical activity was assessed with an Actigraph accelerometer to determine the number of steps and intensity of physical activity expressed in terms of sedentary, light, and moderate-to-vigorous time per day. Participants wore the accelerometer for seven days. A minimum of four measurement days with a wear time of

at least 10 hours was required. The  $\text{VO}_2$  max measured with a graded maximal exercise test was used to determine the CRF. Pearson correlation coefficients were calculated for the associations between the different measures of physical activity and  $\text{VO}_2$  max. For the variables that were associated, linear regression analysis was carried out, with pain and disease activity as possible confounders.

**Results:** Thirteen females and five males were included in the study. The mean age was 66.5 ( $\pm$  15.0) years. Only 22% of the patients met public health physical activity guidelines for the minimal amount of 150 minutes a week. The mean step count was 6237 ( $\pm$  2297) steps per day and mean moderate-to-vigorous physical activity time was 16.50 ( $\pm$  23.56) minutes per day. The median  $\text{VO}_2$  max was 16.23 [4.63]  $\text{ml}\cdot\text{kg}^{-1}\cdot\text{min}^{-1}$ , which is under the standard. Pearson correlations showed a significant positive association for step count with  $\text{VO}_2$  max. No associations were found for sedentary, light, and moderate-to-vigorous physical activity with  $\text{VO}_2$  max. The significant association between step count and  $\text{VO}_2$  max ( $p = 0.01$ ) was not confounded by disease severity and pain.

**Discussion:** Since better CRF protects against CVD, increasing daily step count may be a simple way to reduce the risk of CVD in patients with RA and high CV risk. However, these results need to be confirmed in a larger study group. Future research should investigate if improving daily step count will lead to better CRF levels and ultimately will lead to a reduction in CV risk in patients with RA and high CV risk.

**Conclusion:** Physical activity levels of patients with RA and high CV risk do not meet public health requirements for physical activity criteria and the  $\text{VO}_2$  max was under the standard. Step count is positively associated with CRF.

#### References:

- [1] Agca et al. Atherosclerotic cardiovascular disease in patients with chronic inflammatory joint disorders. *Heart*. 2016;102(10):790-795.
- [2] Lemes et al. Cardiorespiratory fitness and risk of all-cause, cardiovascular disease, and cancer mortality in men with musculoskeletal conditions. *J Phys Act Health*. 2019;16:134-140.

**Disclosure of Interests:** Joëlle van den Hoek: None declared, Marike van der Leeden: None declared, George Metsios: None declared, Georeg Kitas: None declared, Harald Jorstad: None declared, Willem Lems Grant/research support from: Pfizer, Consultant of: Lilly, Pfizer, Michael Nurmohamed Grant/research support from: Not related to this research, Consultant of: Not related to this research, Speakers bureau: Not related to this research, Martin van der Esch: None declared  
DOI: 10.1136/annrheumdis-2020-eular.4766

## HPR Patients' perspectives, functioning and health (descriptive: qualitative or quantitative)

AB1321-HPR

### DEVELOPING A SELF-MANAGEMENT INTERVENTION TO MANAGE JOINT HYPERMOBILITY SYNDROME AND EHLERS-DANLOS SYNDROME HYPERMOBILITY TYPE: AN ANALYSIS INFORMED BY BEHAVIOUR CHANGE THEORY

S. Bennett<sup>1</sup>, N. Walsh<sup>1</sup>, T. Moss<sup>1</sup>, S. Palmer<sup>1</sup>. <sup>1</sup>University of the West of England - UWE Bristol, Faculty of Health and Applied Sciences, Stoke Gifford, United Kingdom

**Background:** Joint Hypermobility Syndrome (JHS) and Ehlers-Danlos Syndrome Hypermobility Type (EDS-HT) are heritable disorders of connective tissue that can cause joint instability and pain and are associated with increased anxiety and depression. There is currently little UK guidance for supporting patients with JHS/EDS-HT<sup>1</sup>. The analysis presented here used the Behaviour Change Wheel (made up of the Theoretical Domains Framework (TDF) and Capability, Opportunity, Motivation and Behaviour (COM-B) model<sup>2</sup>) to identify possible intervention options to improve self-management in people with JHS/EDS-HT.

**Objectives:** To determine recommendations for the components of a behaviour change intervention for people with JHS or EDS-HT.

**Methods:** Data from: 1) A systematic review and thematic synthesis of the literature examining adults' lived experiences of JHS/EDS<sup>3</sup> and 2) A thematic analysis of interview data where UK adults with JHS/EDS-HT (n=17, 14 women, 3 men) discussed the psychosocial impact of the condition on their lives<sup>4</sup>, were mapped onto the TDF and COM-B in a behavioural analysis. A modified Nominal Group Technique focus group (n=9, all women) explored which interventions identified by the TDF/COM-B mapping exercise were most important to them.

**Results:** Participants prioritised a range of potential self-management interventions, including:

**Education:** Participants wanted greater support to improve their knowledge of JHS/EDS-HT, including self-help strategies for coping with injury, fatigue and overexertion, and how to evaluate information about their condition.

**Training:** In activity pacing, assertiveness and communication skills, and what to expect during pregnancy, when symptoms of JHS/EDS-HT can worsen.

**Environmental restructuring and enablement:** Support from occupational therapists to maintain independence at home. Enablement of access to CBT, mindfulness and emotional support.

**Modelled behaviour:** Positive first-person narratives that address how other patients with JHS/EDS-HT have coped with anxiety, depression, distress, fear, frustration and feelings of loss.

**Conclusion:** This study is the first to apply theoretically-informed approaches to the management of JHS/EDS-HT. Through a modified nominal group technique, potential behaviour change interventions for addressing barriers to self-management have been prioritised. Discussion with participants indicated poor access to psychological support, occupational therapy and a lack of knowledge of JHS/EDS-HT. Future research with healthcare professional and patient stakeholder groups will further evaluate which intervention options would be most acceptable and feasible for the management of JHS/EDS-HT.

#### References:

- [1] Palmer, S., Terry, R. Rimes, K.A., Clark, C., Simmonds, J. & Horwood, J. (2016). Physiotherapy management of joint hypermobility syndrome – a focus group study of patient and health professional perspectives. *Physiotherapy*, <http://dx.doi.org/10.1016/j.physio.2015.05.001>.
- [2] Michie, S., van Stralen, M.M. & West, R. (2011). The behaviour change wheel: A new method for characterising and designing behaviour change interventions. *Implementation Science*, 6(42).
- [3] Bennett, S.E., Walsh, N., Moss, T. and Palmer, S. (2019a) "The lived experience of joint hypermobility and Ehlers-Danlos Syndromes: A systematic review and thematic synthesis." *Physical Therapy Reviews*, 24 (1-2). pp. 12-28. ISSN 1083-3196
- [4] Bennett, S.E., Walsh, N., Moss, T. and Palmer, S. (2019b) "Understanding the psychosocial impact of Joint Hypermobility Syndrome and Ehlers-Danlos Syndrome Hypermobility Type: A qualitative interview study." *Disability and Rehabilitation*. ISSN 0963-8288

**Disclosure of Interests:** None declared

**DOI:** 10.1136/annrheumdis-2020-eular.3646

AB1322-HPR

### NON-INFECTIOUS ACUTE INFLAMMATORY ARTHRITIS IN JOINT ARTHROPLASTY

L. Berbel Arcobé<sup>1</sup>, L. Gomez Garcia<sup>2</sup>, M. C. Bernaus Johnson<sup>3</sup>, F. Angles Crespo<sup>3</sup>, S. Martinez Pardo<sup>1</sup>, L. Font Vizcarra<sup>3</sup>. <sup>1</sup>Mútua Terrassa University Hospital, Rheumatology, Terrassa, Spain; <sup>2</sup>Mútua Terrassa University Hospital, Internal Medicine, Terrassa, Spain; <sup>3</sup>Mútua Terrassa University Hospital, Orthopaedic Surgery and Traumatology, Terrassa, Spain

**Background:** Acute inflammatory arthritis (AIA) in a native knee joint is a common pathology with a well-defined differential diagnosis which includes crystal-induced arthritis. Presenting symptoms in a knee joint arthroplasty (KJA) can mimic a periprosthetic hematogenous infection (PHI). There are few studies in current literature that describe possible causes of non-infectious arthritis in KJA. PHI requires, in most cases, an urgent combined surgical and antibiotic (AB) treatment. Describing and studying other possible diagnoses that may resemble PHI in a KJA is mandatory in order to minimize diagnostic errors and avoid unnecessary treatments.

**Objectives:** To analyze the characteristics of AIA in KJA with negative cultures in patients with an initial diagnosis suspicion of PHI.

**Methods:** A retrospective case series was conducted at a tertiary-level hospital including all patients diagnosed with an AIA in KJA with negative cultures from January 2012 to December 2019. Demographic data, clinical presentation, management and outcomes were recorded and analyzed.

**Results:** A total of 11 cases in 9 patients were included (6 females and 3 males) with a median age of 69 years at the time of diagnosis. All patients had risk factors for AIA (6 had chondrocalcinosis (CC), 2 hyperuricemia and 1 psoriasis). However, crystal deposits in synovial fluid (SF) for none of the patients had been previously found.

The median time from the index surgery to clinical presentation was 6 months, and from initial clinical presentation signs to referral was 24 hours. All cases presented with pain and swelling and 5 presented with erythema. Median body temperature on admission was 37.2°C. All patients presented with no acute distress. Initial blood tests showed a median white blood cell count and CRP of 11.160/mm<sup>3</sup> and 90mg/L, respectively. Blood and SF cultures were taken for all cases. The median white blood cell count in SF was 75.883/mm<sup>3</sup>.

Three cases had received AB treatment during a median of 6 days prior to microbiological sampling. After initial sampling, 6 cases received AB prior to surgery, 1 received AB after surgery, 1 received only AB and 3 were treated only with NSAIDs. In all cases, surgical treatment consisted in radical surgical debridement and polyethylene insert exchange.

Further blood and SF tests were performed 4 days after admission. The mean decrease for systemic white blood cell count, CRP and synovial leukocyte count was 46%, 58% and 56%, respectively. All cultures were negative and crystal deposits were not identified for any of the samples.

The median duration of symptoms was 127 days with a good outcome. 6 patients received AB for a median of 69 days.

**Conclusion:** Non-infectious AIA in KJA is a rare entity that should be accounted for the differential diagnosis of periprosthetic joint infection. The initial diagnosis