**Title**

THE WORLDWIDE COLLABORATION ON OSTEOARTHRITIS PREDICTION FOR THE HIP (WORLD COACH) CONSORTIUM: DESIGN AND RATIONALE OF A CONSORTIUM USING INDIVIDUAL PARTICIPANT DATA FROM PROSPECTIVE COHORT STUDIES

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progression (OR 1.54, CI 1.03 to 2.32, Table 1). The model discrimination was poor (0.57), and the model was under-calibrated (1.18, Figure 1).

**Conclusions:** This model supports the importance of female sex as a risk factor for IPJ osteoarthritis progression. Compared with the model developed using Chingford data, this model's calibration improved, further suggesting that sex plays a role in the overall risk of IPJ osteoarthritis progression. However, the overall performance of the model was poor. The discriminative ability of the model might improve if more stringent definitions for IPJ osteoarthritis progression could be used. Further research is required to develop a more specific definition of IPJ osteoarthritis progression. The importance of including symptomatic definitions, such as pain and swelling, for IPJ osteoarthritis also need to be investigated.

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### POPULATION RISK FACTORS FOR SIGNIFICANT ANKLE LIGAMENT INJURY: LARGE MULTICENTRE UK BASED STUDY (SALI STUDY)

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**Purpose:** To describe the phenotype of individuals who suffer an ankle sprain and risk factors associated with the injury.

**Background:** Ankle sprains, one of the most common musculoskeletal injuries, are also a leading cause of post-traumatic osteoarthritis. However, research examining risk factors for suffering an ankle sprain is limited. Understanding the epidemiology of these injuries is vital for improving patients' musculoskeletal health and decreasing the burden of ankle sprains and the associated osteoarthritis.

**Methods:** A large multicentre cohort study with ankle sprain patients (aged 18-70) was recruited from 11 emergency and acute care sites in the UK. The control group (without ankle injury or pain) were recruited within the same departments. Data was collected using self-reported questionnaires at the time of injury. Unless stated otherwise in the description of the characteristics, numbers represent median [interquartile range (IQR)] for continuous variables and n (%) for categorical variables. Statistical significance was set at a level of $p < 0.05$.

**Results:** 1356 patients with an ankle sprain returned the time of injury questionnaire, and 62% of these were female. Sport participation was the most common mechanism of injury (32.2%), followed by injury at home (22.8%), leisure (20%), and work (12.8%). The median age of participants at the time of injury was 37 (27-49) years old, and body mass index was 26.6 kg/m$^2$ (23.4-31.1). 66.8% were non-smokers, and 21.7% were teetotal. Ankle sprains occurred more often in the dominant limb (54%; p=0.004). When compared to the controls, participants who suffered an ankle sprain were significantly younger (p<0.001), more likely to be female (p=0.005) and consumed alcohol (p=0.031). At the same time, there was no significant difference in body mass, height, body mass index, ethnicity, and smoking status.

**Conclusions:** When compared to other acute care attenders, those recruited for the study with an acute ankle sprain were younger and more likely to consume alcohol and be involved in sporting activities.

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### POOR RECOVERY FOLLOWING A SIGNIFICANT ANKLE SPRAIN: RISK FACTORS FROM A LARGE MULTICENTRE COHORT STUDY (SALI STUDY)

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**Purpose:** To examine the risks associated with poor recovery following an ankle sprain three months and one year after the injury.

**Background:** Ankle osteoarthritis is a debilitating condition commonly associated with ankle trauma. Ankle sprains are among the most common musculoskeletal injuries, accounting for 3-5% of all UK Emergency Department visits. Residual symptoms are common, such as pain, swelling, weakness and instability, months and years after the injury. Understanding of the epidemiology of ankle injuries is vital for improving patients' musculoskeletal health and decreasing the burden of associated sequelae.

**Methods:** A large multicentre cohort study recruited patients with ankle injuries (aged 18-70) from 11 Emergency and urgent sites in the UK between 2016-2019. Data was collected using self-reported questionnaires at the time of injury, then three months and one year after injury. Poor recovery was defined as self-reporting pain, lack of confidence in the ankle (perception of giving way) or functional disability in the Foot and Ankle Outcome Score. Comparison between those who did and did not recover poorly was conducted using t-tests for continuous variables and chi-squared tests for categorical variables. Statistical significance was set at a level of p <0.05.

**Results:** 47% reported poor recovery three months post ankle sprain, and 25% 1-year after. A significant difference between those who do and do not recover well three months post-injury was found for body mass index (p=0.042), alcohol consumption (p=0.007), highest education (p=0.017), mechanism of injury (p=0.003), and smoking (amount per day) (p=0.046). No significant difference (p>0.005) was found for age, body mass, height, sex, ethnicity, smoking status, weight-bearing status, plus previous injury to; either same, and opposite ankle. 12 months post ankle sprain there was a significant difference for body mass (p=0.001), height (p=0.005), and body mass index (p<0.001) between those who do and do not recover well, but no significant difference (p>0.005) in age, smoking (status, amount per day, and amount of years), alcohol consumption (status, and amount of unit per week), sex, ethnicity, and highest education.

There was significant differences for treatment(s) received too, with those suffering from poor recovery significantly more often having: NHS physio (p <0.001), fracture clinic (p=0.003), a second x-ray (p=0.002), consultant (p=0.028), private physio (p=0.005), and MRI (p=0.002) as treatments. While no further treatment was significantly less prominent in the poor recovery group (p <0.001). There was no significant difference between those who recover well and poorly for cast, GP, operation, nurse, and support boot as treatments.

**Conclusions:** Some factors and treatments received were significantly different between those who do not recover poorly from an ankle sprain. Higher body mass index was associated with poorer recovery at three months and 1-year post ankle sprain, suggesting a significant role in recovery following an ankle sprain.

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### THE WORLDWIDE COLLABORATION ON OSTEOARTHRITIS PREDICTION FOR THE HIP (WORLD COACH) CONSORTIUM: DESIGN AND RATIONALE OF A CONSORTIUM USING INDIVIDUAL PARTICIPANT DATA FROM PROSPECTIVE COHORT STUDIES

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**Purpose:** Osteoarthritis (OA) is the most prevalent joint disease, affecting at least 500 million people worldwide. Partly due to a lack of knowledge on its etiology, OA is incurable, and symptomatic treatments have only limited effect. Although hip OA is associated with the highest level of disability across all joints, considerably less research has been done in this field in comparison to knee OA. The **World**wide



WORLD COACH CONSORTIUM

Osteoarthritis and Cartilage

Characteristics of the included cohorts

| Cohort name | N participants | N baseline radiographs | Proportion female | Age at inclusion | Maximum follow-up |
|---|---|---|---|---|---|
| Cohort Hip and Cohort Knee(**CHECK**) | 1,002 | 1,002 | 79% | 45 - 65 years | 10 years |
| **Chingford** 1000 women study | 1,003 | 1,003 | 100% | 44 - 67 years | 19 years |
| Johnston County Osteoarthritis project (**JoCo-OA**) | 4,337 | 3,697 | 62% | 35 - 70 years | 21 years |
| Multicenter Osteoarthritis Study (**MOST**) | 3,026 | 3,008 | 60% | 50 - 79 years | 7 years |
| Osteoarthritis Initiative (**OAI**) | 4,796 | 4,771 | 58% | 45 - 79 years | 8 years |
| Rotterdam Study (**RS**) | 14,926 | 11,147 | 58% | ≥ 45 years | 25 years |
| Tasmanian Older Adult cohort (**TASOAC**) | 1,099 | 1,099 | 51% | 50 - 80 years | 10 years |
| Study of Osteoporotic Fractures (**SOF**) | 10,366 | 8,291 | 100% | ≥ 65 years | 8 years |
| **Total or summary:** | 40,555 | 34,018 | 71% | 35 - 80 years | 7 - 25 years |

*Osteoarthritis and Cartilage*

**C**ollaboration on **O**steo**A**rthritis predi**C**tion for the **H**ip (**World COACH**) consortium (Fig. 1) was established to collect and harmonize data from all prospective cohort studies that have data relevant to hip OA available. The consortium aims to better understand determinants and risk factors for development and progression of hip osteoarthritis, as well as to optimize and automate methods for imaging analysis of the hip. This will be pursued through multiple separate research questions and studies within the consortium.

**Methods:** Prospective cohort studies were considered eligible if they had hip imaging (radiographs, computed tomography and/or magnetic resonance imaging) available at two or more points in time, at least four years apart, and if they had a minimum of 200 participants. We have conducted a systematic literature search in Embase, Ovid MEDLINE and Cochrane CENTRAL to identify all studies that fulfilled the inclusion criteria. The search was first carried out in 2017 and repeated in October 2020. Titles and abstracts were screened independently by two researchers, and all described cohorts were further investigated, both by reading the full texts and by additional internet searches. Investigators from eligible cohorts were contacted and asked to collaborate. Meetings were held with the collaborators to establish the aims of the consortium and the concrete research plans. Legal agreements for data sharing were drafted and executed. Individual participant data were collected, pooled, and harmonized into a single database.

**Results:** We screened the titles and abstracts of 1,970 references, from which 195 records were selected for further inspection. Of the 39 study cohorts identified in these records, 10 were considered eligible. So far, 8 cohorts have been included in the consortium, and contact with the other 2 studies has been made. The 8 cohorts currently included in the World COACH consortium contain 40,555 participants (aged 35 to 80 years at baseline), of which 34,018 participants had baseline pelvic radiographs available. In total, 71% of participants were women, and follow-up duration ranged from 7 up to 25 years, with some studies still ongoing (Table 1). Other available imaging data include computed tomography (CT) scans, magnetic resonance imaging (MRI), and dual-energy X-ray absorptiometry (DXA) of the hips. We will also collect data on comorbidities, pain, family history, quality of life, physical activity, genetic, and biochemical markers.

**Conclusions:** The World COACH consortium offers unique opportunities for research on the development and/or progression of hip OA. Future goals that could be achieved are: better insight in hip OA development and progression (by studying determinants and risk factors using harmonized individual participant data), identification of high- and low-risk subgroups for hip OA, the creation of personalized hip OA prediction models, and the development of improved methods to automatically analyze radiological imaging of the hip. More information about the consortium can be found at www.worldcoachconsortium.com

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## FACTORS ASSOCIATED WITH CLINICAL AND RADIOGRAPHIC SEVERITY IN PEOPLE WITH HIP OR KNEE OSTEOARTHRITIS: A CROSS-SECTIONAL POPULATION-BASED STUDY

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**Purpose:** Osteoarthritis is a rising prevalence disease and a leading cause of disability worldwide. The clinical and radiographic severity of people with OA are associated with individual and socio-economic burden. The aim of this study is to estimate the prevalence of hip and/or knee osteoarthritis (HKOA) in Portugal, characterize the population according to clinical severity, and identify the socio-demographic life-styles and clinical factors associated with clinical and radiographic severity.

**Methods:** We analyzed a representative sample of 1081 participants with a validated diagnosis of HKOA, from the population-based study EpiReumaPt. Data were collected in a three-stage approach: 1) structured interview, when sociodemographic, lifestyle and health-related data were collected; 2) clinical appointment with a rheumatologist; 3) diagnosis validation by a team of rheumatologists. The potential associated factors were defined as the sociodemographic, anthropometric, health-related and lifestyle variables, presence of multimorbidity (≥2 non-communicable chronic diseases) and the presence of anxiety and depression symptoms, measured with the Hospital Anxiety and Depression Scale. The outcomes of this study are the clinical and radiographic severity, both collected in the clinical appointment. Clinical severity was measured with the Knee Injury and Osteoarthritis Outcome Scale (KOOS) and with the Hip Disability and Osteoarthritis Outcome Scale (HOOS) and categorized by tertiles in high, middle, and better. Radiographic severity was measured with the Kellgren-Lawrence classification as mild, moderate, and severe OA. We estimated weighted prevalence of HKOA by age class and sex. The factors associated with clinical and radiographic severity were analyzed with multivariable ordinal logistic regression ($p<0.05$, 95%CI). The analysis was performed with SPSS 26.0 complex samples. All analysis were weighted, except for absolute frequencies, that are presented as unweighted counts.

**Results:** The weighted estimated prevalence of HKOA in Portugal was 14.1% (95%CI: 12.6, 15.7), reaching 40.9% (95% CI: 34.3, 47.8) in people with ≥75 years old, and in women (17.5%, 95%CI: 15.3, 19.9). The majority of Portuguese patients with HKOA had mild (48.5%, n=197)