HIP OSTEOARTHRITIS IN ICELAND - A FAMILY AFFAIR?

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**Purpose** To make an intercountry comparison of hip osteoarthritis (OA) between Iceland and Malmö, Sweden.

**Introduction** Risk factors associated with hip osteoarthritis (OA) are not well defined, but include heavy labor, sports and as yet undefined genetic factors. The objective of this study was to assess the prevalence of primary hip OA and incidence of total hip replacement in Iceland, and to compare with published rates for related Scandinavian populations. Settlement in Iceland began in AD 870 and was considered completed in the AD 930, at which time there were some 10 – 20 000 inhabitants on the island. The Vikings brought slaves into the country, mostly from Ireland, during the same period. The population experienced several catastrophic decimations due to disease such as bubonic plague and famine in connection with volcanic eruptions. For example, some 30 % of the Icelandic population perished in connection with eruptions around the year 1783. Until recently, much of the population lived in small isolated fishing and farming communities along the coast line. The Icelandic population, currently a total of some 275 000, thus fulfills several conditions for an enrichment, and identification, of inherited diseases.

**Materials and Method** Radiographs were examined of 1530 Icelandic individuals 35 years or older (653 males, 877 females) subjected to colon radiography in 1987 – 1996. After exclusion of non-primary hip OA cases, the minimum hip joint space was measured with a mm ruler. Presence of hip OA was defined as a minimum joint space of 2.5 mm or less on an a-p radiograph, as recommended (1). The radiograms examined represent about 40 % of all colon radiograms taken in Iceland during this 10-year period. Results were compared with data for South Sweden (2) and Denmark (3), which are based on similar examination of hip OA in colon radiographs. A computer-aided search identified hip arthroplasties from all 6 orthopedic clinics in Iceland that performed this procedure during 1982 – 1996.

**Results** The intra-class correlation coefficient for intra-observer repeated measurements of hip joint space in 174 randomly selected radiograms was 0.717. Of the 1517 individuals included, 227 hips in 165 patients (77 men, 88 women) were diagnosed as having radiologic primary hip OA. The mean age at colon examination for these patients was 68 (35 – 89) years. The overall prevalence of coxarthrosis among all examined individuals 35 years and older was 10.8 % (12 % for men, 10 % for women), rising from 2 % at 35 – 39 years to 35.4 % for those 85 years or older (Fig. 1). When the population structure (age and sex distribution) for those older than 35 years in Iceland was used to standardize prevalence for both Iceland and South Sweden (using previously published data for South Sweden (2)), the age- and sex-standardized prevalence of hip OA for those older than 35 years in Iceland was 8.1 %, compared to 1.2 % for South Sweden.

During 1982 – 1996, 3403 total hip replacements (THR) and 814 hemiarthroplasties (HA) in 1707 men and 2510 women were performed in Iceland. The annual incidence of THR increased from 43 to 133/100 000 and HA from 4 to 15/100 000 during this period. Primary OA accounted for 57 % of these procedures, fractures 25 %, arthritis 2 %, revisions 13 %. For the years 1992 – 1996 the age-standardized incidence of THR for primary OA increased from 3/100 000 among those younger than 39 years of age to 621/100 000 among those 70 – 79 years of age. The mean age at surgery for primary OA was 69 years for both men and women. 1992 – 1996 the age standardized incidence of THR for primary OA increased from 3/100 000 among those younger than 39 years of age to 621/100 000 among those 70 – 79 years of age. The mean age at surgery for primary OA was 69 years for both men and women.

**Conclusions** The prevalence of radiologic primary hip OA is very high in Iceland, and in excess of 5-fold higher than the prevalence found by using similar techniques in studies on related populations in Southern Scandinavia (2,3). The rate difference is particularly notable for those younger than 70 years (Fig. 2). The age-standardized incidence of THR for primary OA in Iceland is twice that in Sweden for the same time period, and increasing while the Swedish rate has reached a steady-state (4,5). We have identified several large Icelandic families with a very high rate of hip OA and THR (6). In the apparent absence of obvious differences in other risk factors between the populations compared here, it may be of interest to screen the Icelandic population for hereditary factors which could be associated with the development of hip OA at a young age.


**Figure 1** Hip OA prevalence in relation to age in Iceland (circles) and Malmö, Sweden (triangles), assessed from colon radiographs. Points represent observed values, lines represent predicted curve fits with r2 greater than 0.90, broken lines represent 95 % confidence intervals for predicted curves. Data for Sweden from (2).

**Figure 2** Predicted age-related ratios (filled symbols) of prevalence of hip OA between Iceland and Malmö, Sweden. The prevalence data used for calculation of age-related ratios are the values predicted from the curve fits in Figure 1. A cubic spline fit was made to the predicted ratio values.