**Fontana L, Neel S, et al. Osteoarthritis of the thumb carpometacarpal joint in women and occupational risk factors: a case-control study. J Hand Surg [Am]2007;32:459-65.**

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Design: case control study

Purpose of study: to explore the associations between occupational factors (job types, hand postures, tasks involving the thumb joint) and the development of carpometacarpal osteoarthritis in women requiring surgery for that condition

Population/sample size/setting:

* 61 white women with carpometacarpal OA (cases, mean age 64) and 120 white women without carpometacarpal OA (controls, mean age 60) in a French urban area
* Source of cases was a specialty center of hand surgery in Beaumont, France
  + All cases were surgically treated for advanced primary carpometacarpal OA
* Source of controls was a department of orthopedic surgery where the controls underwent overnight admission for injuries or traumas due to falls or motor vehicle accidents in Clermont-Ferrand, France
  + All of the controls were examined for symptoms and signs of OA, including pain at rest or with use, painful grind test, decreased range of motion, subluxation or adduction deformity of the carpometacarpal joint, Heberden’s nodes, or Bouchard’s nodes
* The 2 institutions were in the same urban area, and both cases and controls were drawn from the same district area

Assessment of exposures:

* A detailed face-to-face structured interview was developed to ascertain information about age, smoking habits, medical history, family history, lifestyle history (emphasizing sports such as golf and volleyball which expose the thumb joint to stress), activities such as home improvement and domestic work, and occupational factors
* Weight and height were measured to calculate BMI
* The interviews asked about all occupations held for at least six months since leaving school, and the cases were asked for information about the longest held job up to the date of diagnosis; all interviews were conducted by the same investigator
* Cases and controls were asked a series of yes/no questions about an average day’s job activities, using visual aids to facilitate participants’ memories
  + Hand postures requiring a strain or a high load on the CMC joint such as repetitive thumb use (more than 20 movements per minute or thumb flexion-extension at least once per minute), fine or strong pinch actions (tip, lateral, or palmar pinch), gripping/grasping, and pressure on the pad of the thumb
  + Work conditions such as whole body vibration, hand held vibrating tools, working with gloves, exposure to cold, and perceived adverse psychosocial or organizational conditions at work
* Types of occupations were classified according to four-digit codes specified by the International Standard Classification of Occupations (ISCO-88) of the International Labor Office
  + The ISCO-88 group titles define a set of codes as manual occupations, including jobs for which the main tasks include thumb use and assumed to be at risk for CMC OA according to the published literature and the authors’ opinions
  + Jobs included dentistry, nursing, writing, sculpting/painting, tellers/counter clerks, waiters, bartenders, hairdressers, barbers, beauticians, and handicraft workers
  + Other jobs were classified as non-manual occupations

Analysis of results:

* Logistic regression models were used to calculate odds ratios (OR) for occupational factors, adjusted for potential confounders and non-occupational factors
  + Obesity and smoking status were entered into the logistic models based on their common use in epidemiologic studies
  + Adjustment of odds ratios was done for age, parity, hysterectomy history, family history of CMC OA, and occasional jobs, variables for which the data showed differences between cases and controls in the initial analyses
* There was an elevated odds ratio for CMC OA based on the ISCO-88 codes for jobs at risk of OA: the OR was 3.78 with a 95% confidence interval (CI) from 1.20 to 11.92
* There was an elevated OR for repetitive thumb use; the OR was 11.91 with a 95% CI from 3.65 to 38.86
* For jobs perceived by subjects as “not having enough rest breaks during the day” the OR was 5.95 with a 95% CI from 1.66 to 21.28
* After adjustment for the non-occupational factors, no significant association was found between CMC OA and other studied occupational factors, especially with regard to “general manual occupation,” “fine or strong pinch actions,” “gripping/grasping,” “pressure on the pad of thumb,” whole body vibration, working with a handheld vibrating tool, working with gloves, exposure to cold, and perceived adverse psychosocial or organizational conditions on the job

Authors’ conclusions:

* Repetitive thumb use is associated with a higher risk of CMC OA
* Jobs for which the thumb load is greater than would normally occur are associated with an increased risk of CMC OA
* Insufficient perceived rest breaks during the day are associated with an increased risk of CMC OA
* The retrospective nature of the study places the associations at risk of recall bias, if the cases recall job exposures differently from controls
* Although occupational factors are presumed to play a role in the development of CMC OA, mechanical stress is probably only one of many factors which interact to cause the condition

Comments:

* Many suspected risk factors for thumb OA were not observed to have elevated odds ratios: strong pinching/grasping, pressures on the pad of the thumb, and vibrating tool use
* Some of the jobs assumed to be at risk of CMC OA according to the ISCO-88 classification are listed in tables 1 and 2, but it is not clear which jobs would be considered as non-manual jobs for comparison
* For case subjects, only the longest held job before treatment was considered for the analysis of occupations; the meaning of this is not quite clear
  + If it means that the longest held job was not used for analysis of the controls, this is a serious flaw in the study
  + If it means that jobs of shorter duration were not used for the analysis of the cases, then the comparability of cases and controls should be preserved
  + The latter interpretation is more likely than the former
* The retrospective nature of the study does introduce recall bias, as the authors note; it also may be difficult for anyone to recollect accurately the amount of pressure on the pad of the thumb from an occupation which was pursued years ago, but easier to recollect accurately the frequency of thumb movements from the same time period
* Although there are considerable weaknesses in the study, the elevated odds ratios from the ISCO-88 study and the elevated odds ratio from frequent thumb flexion-extension are high enough to support some evidence that job-related physical demands on the thumb increase the risk of thumb OA

Assessment: adequate for some evidence that occupational tasks which place high physical demands on the thumb, such as 20 thumb movements per minute, are associated with an increased likelihood of developing carpometacarpal osteoarthritis. However this could not be included in our chart as there was no way to determine how much time was spent on the job with thumb motion. It was also a retrospective case control which is weak methodology. The task force did not recommend that it be included as evidence based on the multiple deficits.