

Descatha A, Leclerc A, et al. Incidence of ulnar nerve entrapment in the elbow in repetitive work. Scand J Work Environ Health 2004;30(3):234-240.

Design: Observational cohort study

Population/sample size/setting:

- 700 workers who had participated in a longitudinal study of upper extremity disorders in 1993 in France; 598 (178 men, 420 women) of these were followed up in 1996, together with 337 workers who did not perform repetitive work
- The goal of the study was to evaluate personal and occupational factors which predicted incidence of upper extremity conditions in the 3 year interval between 1993 and 1996
- Eligible workers were classed as exposed to repetitive work in one of 5 activity sectors: assembly line manufacture, clothing or shoe industry, food industry, packaging, and supermarket cashiering
- The 598 workers who participated in the 1996 follow-up completed a self-administered questionnaire and were examined by an occupational health physician, who performed a standardized clinical examination at the beginning of the study and again at the 3 year follow-up, using a list or criteria for the diagnoses of diagnosis of upper extremity conditions

Main outcome measures:

- Diagnosis of ulnar nerve entrapment at the elbow was based on (1) **sensory** and motor symptoms in the ulnar nerve distribution, (2) difficulties in moving the elbow, (3) edema in the elbow, (4) **worsening of symptoms by pressure** at the cubital tunnel, (5) weakness and clumsiness of the hand (emphases placed on criteria in boldface)
- Three categories of diagnosis were created: (1) proved diagnosis in the medical examination—all criteria were met, (2) previous diagnosis by a specialist during the 3 year interval, and (3) suspected diagnosis—not all criteria met in the medical exam, or symptoms no longer present at the time of the medical examination
- “Ulnar nerve entrapment” included proved, previous, and suspected diagnoses
- Ulnar nerve entrapment was studied with a list of risk factors, which included: the presence of other diagnoses, personal variables (age, gender, BMI, weight gain, smoking), occupational variables (years on the job, holding in position, turn and screw, work with force—any action performed with force, using elbows for support, holding a tool in position), job control (timing of breaks, pace dictated by machine, no control over the work pace, lack of variety), and low job satisfaction
- During the 3 year follow-up period, 3 new cases of ulnar entrapment occurred
- Multiple potential risk factors were entered into a logistic regression model for the outcome: gender, depression or psychosomatic problems, BMI, using elbows for support, holding a tool in position, age, and activity sector

- In the final logistic regression model, obesity (BMI>30), holding a tool in position, and supporting with the elbow remained as predictors of ulnar nerve entrapment
- In a separate analysis, the presence of 2 other upper extremity conditions also predicted an increased risk of developing ulnar nerve entrapment: medial epicondylitis and carpal tunnel syndrome

Authors' conclusions:

- Workers who already have one upper extremity condition (CTS, medial epicondylitis) are at increased risk of also developing ulnar nerve entrapment at the elbow
- Ulnar nerve entrapment is also associated with occupational risk factors (holding a tool in position) and with obesity
- The study was limited by the small number of incident cases (only 15), by having only clinical criteria for diagnosis (no nerve conduction studies), the non-explicit definition of "suspected cases," and by self-report of exposure
- The workers who reported holding a tool in position did repetitive tasks (using pliers, shoe rivets, spatulas, screwdrivers) with cycle times of less than 30 seconds for half of the workers and cycle times less than one minute for 72% of them
- The ulnar nerve passes through a fibro-osseous tunnel at the elbow, and anatomic studies suggest a mechanism whereby increased stress may entrap the ulnar nerve

Comments:

- As the authors point out, the small number of incident cases limits the number of variables that can be studied separately as risk factors
- In Table 3, the final logistic model, there are 8 coefficients for parameter estimates (1 for gender, 3 for age group, 2 for BMI, 1 for tool in position, and 1 for other musculoskeletal disorder)
- Logistic regression performs best when there are about 10 cases per parameter (minimum of 5); Table 3 appears to try to fit too many parameters
- The cycle times, reported in the discussion rather than in the results section, are difficult to interpret as representing repetitiveness as an independent risk factor by itself
- The exposures are measured in settings (assembly, packaging, etc) in which the work activities are likely to be present for most of the work day (6 hours or more)

Assessment: Adequate for some evidence that ulnar nerve entrapment at the elbow is more likely when other upper extremity disorders are also present, when tools must be repeatedly held in position, and when the worker is obese