

Leclerc A, Landre M-F, et al. Upper-limb disorders in repetitive work. Scand J Work Environ Health 2001;27:268-278.

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
- 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 required to be 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:

- The following 3 diagnoses were the focus of the follow-up examination: (1) carpal tunnel syndrome (CTS), (2) lateral epicondylitis, and (3) wrist tendonitis, which encompassed all cases of flexor tendonitis, extensor tendonitis, and de Quervain's tendonitis
- All 3 diagnoses were studied with the same 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, turn and screw, tighten with force, press with hand or elbow, hit, pull, push, hold in position), psychosocial factors (job control, job demand, social support, work satisfaction), and psychological factors (somatic complaints, depressive symptoms)
- The prevalence of CTS among the 598 workers was 21.9% at the start of the follow-up period; these were excluded from the analysis of CTS incidence
- The prevalence of lateral epicondylitis at the start of the study was 12.2% and for wrist tendonitis the prevalence was 11.2%; these, like the prevalent CTS cases, were excluded from the analysis of incidence
- During follow-up, there were 57 new cases of CTS, 21 in men and 36 in women
- For men, CTS was positively associated with tightening with force and with holding in position; pressing with the hand was negatively associated with CTS (less likely to occur when present)
- For women, CTS was positively associated with weight gain during the 3 year follow-up and with low job satisfaction; other work activity factors were not associated

- There were 64 new cases of lateral epicondylitis, and the data for men and women were pooled together for evaluation of risk factors
- Lateral epicondylitis was positively associated with age, the number of other upper limb diagnoses, with depressive symptoms, and with “turn and screw” on the job
- Wrist tendonitis was positively associated with somatic problems (headache, sleep disturbances, palpitations, personal worries) at the start of the study, with a lack of social support, increased BMI, and job activities requiring repetitive “hitting;” age was negatively associated with wrist tendonitis (younger workers had a higher incidence)

Authors’ conclusions:

- It is difficult to interpret results about incidence of specific disorders in a population with a high baseline prevalence of these disorders, since incidence was being studied among workers who had withstood job exposures up to the point that the follow-up began
- Because 18 different occupational physicians were involved in making the diagnoses, observer biases make interpretation of the incidence data difficult
- The time lag between the onset of a job exposure and the occurrence of an upper extremity condition cannot be determined, since the baseline risk factor may have been present for some time; if the risk factor had strong short-term effects, its effect may have appeared before the start of the study, and its effect on specific diagnoses may not be observed
- Because biomechanical risk factors may be strongly correlated and do not occur in isolation, extrapolation of these results to other populations is not easily done
- However, there are different risk factors for CTS, lateral epicondylitis, and wrist tendonitis
- CTS was associated with forceful movements (tighten with force and hold in position) in men; in women, weight gain was associated with CTS
- Lateral epicondylitis has a strong association with other disorders, suggesting that overuse of the elbow may be a consequence of other disorders, such as wrist disorders, which lead workers to modify motions previously used
- For wrist tendonitis, repetitive hitting was the only biomechanical risk factor identified
- Psychosocial factors were not very strongly associated with the incidence of upper extremity disorders
- Because of the three-year interval between the start of the study and the follow-up, some factors with shorter lag times (psychosocial factors, some job activities) may not have been observed

Comments:

- Although the discussion is thoughtfully done, and the authors discuss the difficulties in interpreting their data, the main difficulty in assessing causation is the fact that exposure to repetitive tasks was required for entry into the study

- This means that there is a limited range of biomechanical factor exposure; workers with low levels of exposure were not included in the study and this limits the ability of the investigators to identify causal job activities
- It was not clear from the article itself whether the clinical examinations that led to the diagnoses included information about work activities
- From previously published work by the same authors, it appears that the occupational physicians did review the questionnaire data at the time of the clinical examination
- Therefore, the diagnosis may have been influenced by knowledge of the job exposure, creating a potential bias expected to increase the association between job and work factors
- “Turn and screw” would physiologically be forearm and wrist supination for a right-handed worker
- The study was done in settings (assembly, food, packaging) in which the work exposures are likely to be operative most of the working day (6 hours or more)

Assessment: Adequate for statement that repetition alone is not a clear risk factor, but must be in combination with other workplace factors such as force