Shiri R, Viikari-Juntura E, et al. Prevalence and Determinants of Lateral and Medial Epicondylitis: A Population Study. Am J Epidemiol 2006;164: 1065-1074.

Design: Cross-sectional health survey

Population/sample size/setting:

- 4698 subjects aged 30-64 years who participated in the Health 2000 Survey, a national population-based health examination survey in Finland
- The purpose of the national health survey was to obtain information on cardiovascular, respiratory, musculoskeletal, and mental disorders in men and women over 30 residing in Finland between fall of 2000 and spring 2001
- Subjects had been selected by random cluster sampling, and had home interviews, physical examinations by physicians, and laboratory tests
- The 4698 subjects selected for this study had data on the physical status of the elbow and did not have rheumatoid arthritis; this represented 80% of the 5871 survey participants between 30 and 64 years of age

Main outcome measures:

- Home interview elicited information on age, gender, smoking, education, and leisure physical activity; BMI was calculated for all subjects
- At the time of the home interview, fasting serum samples were taken for lipid profiles and measurement of C-reactive protein
- Physical demands of work were assessed by home interview; the current job and five longest lasting former jobs were scrutinized for workload factors
- Definite lateral epicondylitis (LE) was diagnosed if there was pain at the elbow in the past 30 days, with pain at the lateral epicondyle increasing with resisted extension of the wrist with the elbow extended during physical examination
- Possible LE was diagnosed if there was elbow pain in the last 30 days with tenderness on palpation at the lateral epicondyle on physical examination
- Definitions of definite and possible medial epicondylitis (MW) were analogous to those of LE
- The workload factors were: (1) manual handling of loads (lifting, carrying, pulling, pushing) heavier than 5 kg at least 2 times per minute for at least 2 hours per day, (2) manual handling of loads heavier than 20 kg at least 10 timer per day, (3) high handgrip forces at least 1 hour per day on average, (4) repetitive movements (packing and sorting out) of hands and wrists at least 2 hours per day on average, (5) keying (typing, cash register, computer) at least 4 hours per day on average, and (6) using a vibrating tool at least 2 hours per day on average
- The prevalences of the diagnoses were: LE (definite and possible), 2.8%, ME (definite and possible), 1.9%, concurrent LE and ME, 1.2%
- Age was a predictor of LE and ME; the prevalence was higher in the age group 45-64 than in the age group 30-44
- ME and possible LE were more common in women than in men, but there was no sex difference for definite LE

- Prevalence of LE and ME was lower in subjects with high education than with low education; leisure-time physical activity was not related to LE or ME
- Smoking was associated with LE and ME, but no clear dose-response (pack-year) relationship was seen for current smokers
- BMI and increased waist-hip ratio were strongly associated with ME but not with LE; the associations were significant only for women
- Keyboarding for at least 4 hours per day was negatively associated with LE and ME, making it appear to be protective against these diagnoses
- Because of a high correlation between handgrip forces and handling loads greater than 5 or 20 kg, these exposures were grouped into a single variable designated "forceful activities"
- Statistical models which adjusted for age, sex, and other determinants of LE found that forceful activities alone were not predictive of LE
- Similarly, the statistical models found that repetitive activity alone was not associated with LE
- However, there was a significant interaction between force and repetition, meaning that when both were present, the prevalence of definite or possible LE was 5.6 times as great as when neither was present
- In contrast to the data for LE, forceful activities alone were associated with ME in men; repetitive activity alone was associated with ME in women
- Also in contrast to the data for LE, there was no interaction between force and repetition for ME
- Vibrating tool use was not significantly associated with ME or LE

Authors' conclusions:

- Although neither force nor repetition was associated with LE, the statistical interaction between them in the data implies that there is a synergism between them in increasing the prevalence of LE
- The current data are consistent with previous studies showing that a combination of force and repetition are associated with LE and ME
- Although there were no data on specific sports activities in this study (tennis or golf), it is unlikely that workers with high work exposures to force and repetition play these sports more frequently than other workers not so exposed
- Smoking was associated with LE and ME; this may arise if smoking impairs circulation to the tendons, placing them at risk for injury
- Obesity was associated with ME; this could arise if obesity increases insulin resistance, but further studies are needed to clarify this relationship
- LE and ME are common in the working population; physical load factors are associated with both conditions

Comments:

- The cross-sectional nature of the study, as the authors acknowledge, places limits on causal inference between physical load factors and epicondylitis
- The home interview asked about the 5 longest-lasting jobs, but the article does not report on how frequent job changes were in the study population, nor on whether LE and ME are associated with frequent job changes

- The exposure “repetition” was counted as any repetitive activity for greater than 2 hours per day; this could mean anything between 2 and 8 hours per day, and is not well enough defined to qualify as a meaningful exposure measure
- Handgrip force, loads heavier than 5 kg, and loads heavier than 20 kg were grouped into a single variable for purposes of statistical analysis, but this prevents a precise quantitative estimate of the amount of force likely to increase the occurrence of LE or ME
- The fact that the study was part of a general health survey may help prevent biased reporting of job exposures and LE/ME, since the subjects would not be aware of the investigators’ study objectives
- The negative association between keyboard use and LE/ME suggests that it is not likely to be a risk factor for either condition

Assessment: Adequate for an evidence statement that LE is associated with a combination of force and repetition, adequate for an evidence statement that keyboard use is unlikely to be associated with either condition