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Lateral epicondylitis: new evidence for work relatedness

Alexis Descatha

Universite de Versailles Saint-Quentin

Ann Marie Dale

Washington University School of Medicine in St. Louis

Barbara A. Silverstein

Washington State Department of Labor and Industries

Yves Roquelaure

LUNAM Universite

David Rempel

University of California - San Francisco

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Editorial

Lateral epicondylitis: New evidence for work relatedness

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Lateral epicondylitis is one of the most common upper-limb musculoskeletal disorders in general practice [1] and in working population [2] with an estimated incidence ranging from 0.3–1.1 per 100 person-years [3]. Its description by Runge in 1873 and Major in 1883 as “Lawn-tennis elbow” was due to its association with the biomechanical injuries in this sport [4]. Recent systematic reviews concluded that there was moderate evidence of an association between epicondylitis and occupational exposure to forceful and repetitive hand activities [5,6]. However, the evidence for this association was primarily based on cross-sectional studies. As there was only one prospective study available [7], the causality of the reported association between occupational exposure and the occurrence of lateral epicondylitis has been debated [6].

Three large, longitudinal studies on musculoskeletal disorders were recently completed which address the issues of workplace exposures and risk for lateral epicondylalgia with greater precision. In this paper, we have summarized these studies and drawn conclusions from their findings.

All three studies were published in 2013; two were conducted in the United States, and one in Europe [8–10]. Lateral epicondylalgia is the term used for outcome since each study used a standard definition for possible epicondylitis that included specific symptoms and/or physical examination manoeuvre [11,12] (Table 1). In the French Cosali study (Principal investigator Y. Roquelaure), 3710 workers, representative of the workforce, were identified by 83 occupational physicians; the cohort included 1394 workers without elbow pain who were followed on average for 5.5 years [8]. The incidence of lateral epicondylalgia was 1.0/100 person-years. Self-reported high physical exertion (Borg₂₀ rating > 13) combined with reported elbow flexion and extension, or with extreme wrist bending for > 2 h/day, was associated with lateral epicondylalgia with an estimated relative risk of 3.2 in men (95% confidence interval [1.5–6.4]) and 3.3 [1.4–7.6] in women. The PrediCTS study (Principal investigator B. Evanoff) included 1107 newly employed

workers from 8 companies and 3 construction trade unions in the Saint-Louis area; 699 workers without elbow pain at baseline were followed on average for 2.8 years [10]. The incidence of lateral epicondylalgia was 1.7/100 person-years. Self-reported exposure to wrist bending ≥ 4 h/day and forearm twisting ≥ 2 h/day was associated with lateral epicondylalgia, with an estimated relative risk of 2.5 [1.1–5.3]. In a study from Washington State (Principal investigator B.A. Silverstein), 733 workers were included from 12 different manufacturing and service sector industries, with 611 workers (without epicondylitis) followed on average for 1.5 years [9]. The incidence of lateral epicondylalgia was 4.9/100 person-years, and was associated with forearm pronation $\geq 45^\circ$ for 40% of the time and power grip (both assessed by observation), with an estimated relative risk of 2.8 [1.4–5.8].

Although the definitions of lateral epicondylalgia, exposure assessment, inclusion criteria and statistical models were somewhat different, strenuous manual tasks involving the elbow or hand were consistently found to be associated with the occurrence of new cases of lateral epicondylalgia in all three studies. These studies did not include detailed physical examinations of the elbow to differentiate between epicondylitis, tendinitis and tendinosis (and related terms), so the term lateral epicondylalgia was preferred. Different limitations were reported for each study, e.g. lack of representativeness of national workforce [9,10], attrition [8], self-reported assessment of diagnosis [8] or workplace physical exposures [8,10], and confounding factors [9]. However, one of the studies had a representative sample [8], two had low attrition rates and confirmatory physical examination [9,10], one had observations of exposure [9], and one a complete analysis of confounders [10].

These three prospective studies provide new evidence for four of the Hill criteria for causality in observational studies [13]: temporal sequence, consistency between studies, strength of association (similar estimations of relative risk, between 2.5 and 3.3), and a biological gradient increasing with exposure. There is also good compatibility with findings from previous workplace studies [6,7] and with what has been observed in athletes [14] from overuse of the forearm extensor muscles and the resultant microtrauma that leads to angiofibroblastic tendinosis (biological plausibility) [14,15].

In conclusion, these recent complementary prospective studies provide new insights and strong evidence for a relationship between lateral epicondylalgia and occupational exposure to high hand force and non-neutral elbow and wrist postures. Compensation guidance, management and prevention should incorporate

Table 1

Details of the three longitudinal studies.

Name of the cohort (and the Principal investigator)	Country	Inclusion and number of workers followed	Definition of lateral epicondylalgia	Definition of main exposure	Incidence rates (per 100 workers)	Relative Risk
Cosali (Y. Roquelaure) [8]	France	3710 workers examined by 83 occupational physicians, 1394 workers were followed on average for 5.5 years	Pain around lateral epicondyle for ≥ 4 days over a period on one week in the last 12 months, or local pain on resisted wrist extension	Self-report, high physical exertion (Borg ₂₀ rating > 13) combined with elbow movements (elbow flexion and extension, or extreme wrist bending, > 2 h/day)	Men: 1.0 Women: 0.9	Men IRR = 3.2 [1.5; 6.4]; Women IRR = 3.3 [1.4; 7.6]
Predi-CTS (BA Evanoff) [10]	United States	1107 newly employed workers without carpal tunnel syndrome from 8 companies and 3 trade unions, 699 workers without elbow pain were followed on average for 2.8 years	Elbow symptoms and (either one): a) Pain around lateral epicondyle at palpation or b) Pain on resisted wrist extension	Self-report, bending ≥ 4 h/day and twisting ≥ 2 h/day	1.7	OR = 2.5 [1.1; 5.3]
Washington study (BA Silverstein) [9]	United States	733 workers from 12 different manufacturing and service sector employers, 611 workers were followed on average for 3.5 years	Any elbow pain in the past 7 days, and symptoms occurring more than 3 times in the last year, AND no previous elbow injury AND pain on resisted wrist extension	Observed, forearm pronation $\geq 45^\circ$ for 40% time and power grip	4.9	HR = 2.8 [1.4–5.8]

IRR: incident rate ratio (adjusted on age, repetitive task; stratified on gender); OR: odds ratio (adjusted on gender, age, social support level of education, medical history of diabetes, osteoarthritis, rheumatic arthritis and obesity); HR: hazard ratio (adjusted on gender and age).

these new findings and practitioners from primary to secondary care should note strenuous biomechanical hand and elbow exposures for patients with lateral epicondylalgia.

Disclosure of interest

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The authors declare that they have no conflicts of interest concerning this article.

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Alexis Descatha^{a,b,c,*}

Ann Marie Dale^d

Barbara A. Silverstein^e

Yves Roquelaure^f

David Rempel^g

^a Université de Versailles Saint-Quentin, 78035 Versailles, France

^b Inserm, UMS 011, 94807 Villejuif, France

^c AP-HP, Poincaré University Hospital, Occupational Health Unit, 92380 Garches, France

^d Division of General Medical Sciences, Washington University School of Medicine, Saint-Louis, MO, USA

^e Safety and Health Assessment and Research for Prevention (SHARP), Washington State Department of Labor and Industries, Olympia, WA, USA

^f LUNAM Université, Université d'Angers, Laboratoire d'ergonomie et d'épidémiologie en santé au travail (LEEST), 49045 Angers Cedex 01, France

^g Department of Medicine, University of California, San Francisco, CA, USA

*Corresponding author. Inserm UMS 011, UVSQ, unité de pathologie professionnelle, CHU de Poincaré, 104, boulevard Poincaré, 92380 Garches, France. Tel.: +33 1 47 10 77 64; fax: +33 1 47 10 77 68.

E-mail address: alexis.descatha@uvsq.fr (A. Descatha)

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