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Literature review

Occupational prognosis factors for ulnar nerve entrapment at the elbow: A systematic review

Facteurs pronostiques professionnels dans la compression du nerf ulnaire au coude : revue systématique

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ABSTRACT

Although ulnar nerve entrapment is the second most common entrapment neuropathy, there is a dearth of studies identifying occupational prognosis factors. We carried out a systematic review of the occupational prognosis factors for ulnar nerve entrapment in order to identify professions at risks and allow better follow-up for their workers. Using the key words, "ulnar OR cubital", "neuropathy OR tunnel", and "work OR occupational" without limitations, original prospective studies were selected from four databases (PubMed, Embase, Web of Science, Cochrane Library) after two rounds (valid design, valid prognosis outcome reported, valid work exposure). Associations between prognosis for ulnar neuropathy and occupational factors were extracted and analyzed qualitatively. Dating from 1981 to 2013, three prospective studies were included; 1420 cases of ulnar nerve entrapment were followed for an average of 4 years and occupational exposure was retrieved. The only high-quality study (related to this question) found a significant relationship between occupational exposure and prognosis with an odds ratio for ulnar nerve entrapment of 1.78 (1.10–2.88). The two other studies were less focused on the occupational prognosis factors; one found that work activity requiring effort had worse prognosis after surgery, while the other found no significant relationship between occupational hand exposure and prognosis. Occupations requiring high effort may be associated with more severe ulnar neuropathies, but further studies (exposure as well as associated disorders) are mandatory for clinicians to provide work task information to their patients.

Mots clés :
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Syndrome du tunnel cubital
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RÉSUMÉ

Bien que la compression du nerf ulnaire soit la deuxième neuropathie la plus fréquente, il n'y a que peu d'études identifiant les facteurs de pronostic professionnels. Nous avons réalisé une revue systématique portant sur les facteurs pronostiques professionnels dans la compression du nerf ulnaire au coude, afin d'identifier les professions à risques et de permettre de mieux suivre ces travailleurs. À partir des mots clés « *ulnar OR cubital* », « *neuropathy OR tunnel* », *and* « *work OR occupational* » (sans limite), les études prospectives originales ont été incluses à partir de quatre bases de données (PubMed, Embase, Web of Science, Cochrane Library) après deux tours (design valide, pronostic valide, exposition au travail valide).

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L'association entre le pronostic de la neuropathie ulnaire et les facteurs professionnels a été extraite et analysée qualitativement. Entre 1981 à 2013, 3 études prospectives ont été incluses, avec 1420 cas de compression du nerf ulnaire suivis pendant une moyenne de 4 ans et une exposition professionnelle documentée. La seule étude de très bonne qualité (sur cette question) a mis en évidence une relation significative entre l'exposition professionnelle et le pronostic professionnel défavorable avec un *odds ratio* de 1,78 [1,10–2,88]. Les deux autres étaient moins centrées sur le facteur de pronostic professionnel ; l'une a constaté que l'activité physique exigeante professionnelle avait un mauvais pronostic, tandis que l'autre n'a trouvé aucune relation significative entre l'exposition professionnelle et le pronostic. Les professions nécessitant un effort élevé peuvent être associées à des neuropathies ulnaires de moins bon pronostic, mais d'autres études sont obligatoires (tant sur l'évaluation des expositions que la définition de la maladie), afin que les cliniciens puissent fournir des informations sur la reprise professionnelle à leurs patients.

1. Introduction

With a prevalence of 0.6–0.8% and incidence rate of 20–25 per 100,000 person–year [1,2], ulnar nerve entrapment (UNE) or cubital tunnel syndrome is the second most common entrapment neuropathy after carpal tunnel syndrome [3]. Diagnosis often requires nerve conduction studies to confirm clinical findings [3], since a non-negligible proportion of ulnar neuropathy-like symptoms are associated with normal conduction [4]. Among possible etiologies, occupation-related UNE is now considered one of the most important [5], especially since they can be easily prevented if early adjustments are made. Risk factors are being better documented and identified, whether they are demographical [6] or occupational [7]. Although surgical outcomes for UNE are well documented [8,9], few studies have explored prognostic factors exhaustively. Thanks to questionnaires (e.g., Disabilities of the Arm, Shoulder and Hand [DASH] score, Bishop scale), practitioners can assess the severity of UNE and thus have tools at their disposal for estimating prognosis. The ability to identify patients associated with a bad prognosis based on occupation seems important for surgeons and therapists, so they can inform their patients about what to do and what to avoid at their workplace. While physical therapy or surgical procedures may have good effectiveness, a non-negligible group of patients has no improvement or worse symptoms after treatment, which shows how important preventive measures are [10], even without taking into account complications following surgery. However, there is a clear lack of studies identifying occupational prognosis factors.

The aim of this study was to undertake a systemic review of the available epidemiologic data regarding occupational factors that impact on the prognosis of UNE, and thus on the patients' return to work. Identifying workers whose job is associated with a poor prognosis for UNE, whether or not they undergo surgery, will support taking preventive measures earlier, and prevent additional costs due to surgery and absence from work, as well as allowing diagnosis at an early stage, and thus better recovery.

2. Material and methods

The protocol can be accessed at: http://www.crd.york.ac.uk/PROSPERO/display_record.asp?ID=CRD42016042830 (PROSPERO registration, CRD42016042830).

2.1. Literature search

Four databases (PubMed, Web of Science, the Cochrane Library and Embase) were searched using the following keywords (ulnar OR cubital) AND (neuropathy OR tunnel) AND (work OR occupational). There were no particular restrictions. Possible papers quoted in selected articles were also included if they were related to the subject. The first selection of articles was based on the title and abstract in order to exclude irrelevant papers. The second selection round focused on full articles to determine whether occupational factors were specified. Both searches were done by two independent reviewers (MF and AD). Observational and longitudinal studies were retained that included different levels of biomechanical exposure and a correct definition of UNE.

2.2. Assessment of methodological quality

Methodological quality was assessed using criteria from the Cochrane Centre, and our recent systematic reviews on lateral epicondylitis [11], which was slightly adapted. The list comprised five topics covering 20 items:

- study population;
- assessment of exposure;
- assessment of outcome,
- study design and analysis;
- data presentation (Appendix 1).

Assessment was done independently by two reviewers (MF and AD). The quality score for each study was calculated by adding the number of positive criteria. Disagreement was resolved by consensus. The methodology of a study was considered high quality if the score was 13 or higher. This threshold was chosen empirically to represent over two-thirds of the scale.

2.3. Data extraction and analysis

Relevant data were extracted from the articles including UNE diagnosis criteria, UNE prognostic and occupational exposure. For exposure, we compared different levels of worker exposure for each study separately and grouped them together, taking into account force, posture, handling of vibrating tools, handling of non-vibrating tools, if data were available. The primary outcome was health improvement, which was evaluated by the level of residual pain, paresthesia, or motor impairment, whether they were assessed by a questionnaire, scores or solely clinical criteria. We also considered return-to-work as a secondary outcome. The PRISMA checklist was used [12] (Appendix 2).

3. Results

We selected 54 articles, corresponding to our first round criteria, from the four databases searched (Appendix 3). Thirty-two papers were included based on the titles and abstracts (Fig. 1) and three were selected during the last selection round after reading

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