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Upper limb functional capacity of working patients with osteoarthritis of the hands: A cross-sectional study

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ABSTRACT

Study Design: A cross-sectional design was used.
Introduction: Little is known about the effects of osteoarthritis of the hands (OAH) on work ability in working patients with OAH.
Purpose of the Study: The study aimed to analyze the differences in upper limb functional capacity (ULFC) between working patients with OAH and healthy workers and to evaluate variables associated with ULFC and with self-reported disability (SRD) in working patients with OAH.
Methods: Forty-one patients performed the ULFC Evaluation (ULFCE) and also completed 2 SRD measures. The patients' results were compared with the ULFCE results of 82 matched healthy workers from a reference database. Three sets of multivariate regression analyses were used to reveal the predictors of ULFC and SRD.
Results: Patients scored 12%-45% lower on all ULFCE tests (P values ranging from P P Discussion Working patients with OAH had a considerably lower ULFC compared with healthy workers. Female gender and the presence of OAH predicted lower ULFC. Pain and lower finger strength predicted worse scores on SRD.
Conclusion(s): In the case of professionals advising working patients with OAH, our results suggest that a careful evaluation of the ULFC and SRD is warranted. Subsequently, advice regarding exercises or adjustments at work can be given.
Level of Evidence: 3b.

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Introduction

The aging working population in developed countries could lead to an increase of workers that suffer from health issues that may interfere with work ability.[1-3] Osteoarthritis (OA) is one of these health issues. The prevalence of OA increases with age.[4-7] In 2010, 1.5 million people in the Netherlands (16 million inhabitants) suffered from OA,[8] a prevalence of 11.8%. The prevalence of OA in the Netherlands has risen by more than 50% from 1991 to 2011. From 2011 to 2030, it is expected that this number will increase by another 40%.[9] OA is predicted to become the fourth leading cause of disability worldwide.[10] In OA, the hands are the most common joint group affected.[11] OA of the hands (OAH) has an important impact on quality of life because of pain, reduced joint mobility, grip strength, and limitations in activity and participation.[12-14] However, little is known about the effects of OAH on work ability in working patients with OAH.[15,16] Several work-related and individual factors are related to work ability. One of the individual factors is a person's functional capacity (FC).[17,18] FC can be measured using a functional capacity evaluation (FCE). An FCE is an evaluation of the capacity to perform activities and is used to make recommendations for participation in work, while also considering the person's body

Conflict of interest: All authors declare that they have no conflict of interest.
All procedures followed were in accordance with the ethical standards of the responsible committee on human experimentation (institutional and national) and with the Helsinki Declaration of 1964, as revised in 2013. Informed consent was obtained from all patients for being included in the study. This article does not contain any studies with animals performed by any of the authors.
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functions and structures, environmental factors, personal factors, and health status.[19]

Purpose of the study

The effect of OAH on the upper limb FC (ULFC), in working patients with OAH, is as yet not known. Our study is therefore intended to analyze possible associations between OAH and the upper limb functional capacity evaluation (ULFCE) in working patients with OAH. The first aim of this study was to compare and quantify a possible difference in ULFC between working patients with OAH and healthy workers. The second aim was to explore variables associated with ULFC. This may result in better recommendations for optimizing ULFC and work participation.

Furthermore, the function of the upper limbs can not only be measured with a capacity test, such as ULFCE, but can also be assessed with self-reported disability measures (SRDM).[20,21] Both measures do not necessarily measure the same constructs. It has already been demonstrated in OAH that SRDM and capacity tests are related but different.[20] What remains unclear is how exactly both entities are interrelated and what variables are associated with SRD. Therefore, the third aim of this study was to explore the relation of ULFC to SRD and explore the variables associated with SRD in working patients with OAH.

Methods

Design

In this cross-sectional study, approved by the Medical Ethical Committee of the University Medical Center Groningen (UMCG; METc2011.363), the Netherlands, working patients with OAH performed the ULFCE and completed 2 SRDM. The ULFCE was compared with that of matched healthy workers from a historic reference database.[19]

Procedures

Using the 9th version of the International Statistical Classification of Diseases and Related Health Problems coding, eligible patients were selected from the database of the outpatient Department of Rehabilitation Medicine of the UMCG and invited to participate in the study. Patients gave their written informed consent before study entrance and received a gift voucher (€15) after participation in the study. OAH was diagnosed and graded by an experienced radiologist based on an X-ray of the hands that was made during the previous year, using a predetermined protocol: all the joints of the fingers were graded according to the Kellgren and Lawrence rating (KL-score)[22]; when one joint in a row (distal interphalangeal, proximal interphalangeal, metacarpophalangeal, or carpal joints) was graded 2 (definite osteophyte formation with possible joint space narrowing), the row was defined as positive. Patients with at least 2 (of the 4) positive rows on both hands were diagnosed with OAH and eligible for the study.[4] Sociodemographic and clinical data such as age, gender, height, weight, hand dominance, playing a musical instrument, performing activities requiring intensive use of the hands, primary occupation (including duration of sick leave caused by OAH in the last year, working hours per week, and years at the same job), smoking, alcohol consumption, and pain intensity were collected during a short interview preceding the ULFCE.[23,24] Then, 2 SRDM, Quick Disabilities of the Arm, Shoulder and Hand Outcome Measure Dutch Language Version (QuickDASH-DLV), and FIHOA were filled out.[20,23,25] OAH was clinically classified using American College of Rheumatology (ACR) criteria.[26]

ULFCE

The ULFCE consisted of 7 tests (Textbox 1): handgrip strength, finger strength, fingertip dexterity, hand and forearm dexterity, overhead lifting, overhead working, and repetitive side reaching. Patients were allowed to end testing at any moment. All patients performed the ULFCE under the guidance of the same, trained FCE instructor.

SRDM

The QuickDASH-DLV is a shortened Dutch language version of the Disabilities of the Arm Shoulder and Hand questionnaire. The QuickDASH uses 11 items to measure physical function and symptoms in people with any or multiple musculoskeletal disorders of the upper limb. The optional work module is intended for workers whose jobs require high levels of physical performance. The responses for both modules are scaled on a 5-point Likert scale (1 = no difficulty, 2 = slight difficulty, 3 = difficulty, 4 = serious difficulty, 5 = impossible). The score ranges for both parts from 0 to 100 (higher scores indicate more severe disability). There is strong and positive evidence for reliability and validity (hypothesis testing) of the QuickDASH and moderate positive evidence for structural validity testing.[35]

The Functional Index for Hand Osteoarthritis, Dutch translation (FIHOA) is a questionnaire specifically designed for measuring hand functionality in patients with OAH and contains 10 questions focusing on activities of the hands. The responses are scaled on a 4-point Likert scale (0 = possible without difficulty, 1 = possible with slight difficulty, 2 = possible with serious difficulty, and 3 = impossible). The score ranges from 0 to 30 (higher scores indicate more activity limitations). The Dutch translation is based on the original French FIHOA: psychometric properties, internal consistency: Cronbach's $\alpha = 0.89$, test-retest reliability: intraclass correlation of 0.96.[23,25]

Pain intensity

Using a 10-cm VAS (Visual Analogue Scale, anchored no pain [0] and worst imaginable pain [10]), pain intensity was assessed 5 times, 3 times immediately before (worst and least pain in preceding week and current pain), and 2 times after completion of the ULFCE (pain during and after ULFCE).[23]

Subjects

Adult working patients with OAH who met the inclusion criteria (working at least 8 h/wk for the last year and being diagnosed with primary OAH based on an X-ray of the hands that was made during the last year) and none of the exclusion criteria (intellectually or physically unable to perform the ULFCE, having suffered an injury or undergone an operative procedure of the upper limbs, or having another co-morbidity influencing the ULFC) were recruited from June 2012 until June 2014 at the outpatient Department of Rehabilitation Medicine of the UMCG, the Netherlands. Every patient was matched to 2 healthy workers from a historic reference database[19] on gender, age, height, and Dictionary of Occupational Titles (DOT) category (a systematic coding scheme of physical work demands and different professions)[36] based on their primary occupation. Gender and DOT category were exactly matched. Age and height were matched with a maximum range of 10 years (mean range 4.8 years) and 8 cm (mean range 4.5 cm), respectively. A sample size calculation (P value .05 and power 0.80), with a difference in means in handgrip strength (which was taken as primary outcome measure) between patients[37] and healthy workers[19] of 6.4

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