Prevalence of Symptomatic Hand Osteoarthritis and Its Impact on Functional Status among the Elderly

The Framingham Study

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Osteoarthritis is one of the most common joint disorders in the elderly, yet few studies have targeted symptomatic osteoarthritis, especially symptomatic hand osteoarthritis. The authors conducted a survey in 1992–1993 among an elderly population to estimate the prevalence of symptomatic hand osteoarthritis and to assess its impact on grip strength and functional activities. Framingham Study subjects received hand radiographs and answered queries on joint symptoms. Functional activities were assessed using an interviewer-administered questionnaire. Grip strength and observed functional performance were evaluated using standard procedures. A hand joint was defined as having symptomatic osteoarthritis if both symptoms and radiographic evidence of osteoarthritis were present. Of 1,041 subjects aged 71–100 years (36% men), the prevalence of symptomatic hand osteoarthritis was higher in women (26.2%) than in men (13.4%). Compared with those without symptomatic hand osteoarthritis, subjects with the disease had 10% reduced maximal grip strength, reported more difficulty writing, handling, or fingering small objects (odds ratio = 3.4), and showed more self-reported and observed difficulty carrying a 10-pound (4.5-kg) bundle (odds ratio = 1.7 and 1.6, respectively). In conclusion, in the context of a remarkable paucity of data on the epidemiology of symptomatic hand osteoarthritis, this study suggests that symptomatic hand osteoarthritis is a common disease among elders and frequently impairs hand function.

activities of daily living; hand; hand strength; osteoarthritis; prevalence

Abbreviations: CI, confidence interval; OR, odds ratio.

Osteoarthritis is the most common age-related joint disorder both in the United States and throughout the world, and symptomatic osteoarthritis is a leading cause of disability among elders in Caucasian populations (1). To date, most epidemiologic studies have focused on radiographic osteoarthritis, and relatively few population-based studies have targeted symptomatic disease, especially symptomatic hand osteoarthritis (2). In a paper published in 1998 (3), the National Arthritis Data Workgroup stated that the prevalence of symptomatic hand osteoarthritis has not been systematically studied in the United States. To estimate the prevalence of symptomatic hand osteoarthritis in the US population, the Workgroup had to use the results from a population-based study conducted in a working-class area of northern England in the 1950s and 1960s (4).

In addition, the impact of symptomatic hand osteoarthritis on the population has not been well evaluated. In clinical samples, Baron et al. (5) found that subjects with symptomatic hand osteoarthritis often have limited hand function. Oliveria et al. (6) indicated in 1995 that the incidence of

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cases seeking care for symptomatic hand osteoarthritis (100 cases per 100,000 person-years) was as high as that for symptomatic hip osteoarthritis (88 cases per 100,000 person-years). If symptomatic hand osteoarthritis is highly prevalent among elders, it could be an important contributor to functional loss, especially for upper extremity functions.

We conducted an epidemiologic survey among the participants in the Framingham Study to describe the prevalence of symptomatic hand osteoarthritis among the elderly population. We also examined its relation to grip strength and to functional limitations.

MATERIALS AND METHODS

The Framingham Study was established in 1948 in the town of Framingham, Massachusetts. The original cohort included 5,209 subjects who were 26–62 years of age at the first examination. Subjects have been examined biennially since then. At each examination, participants have received a medical history interview, a physical examination, and a series of laboratory tests. As part of osteoarthritis study performance during 1992–1993, subjects received posteroanterior radiographs of both hands and were asked about hand joint symptoms and ability to perform several daily activities at a single visit. Grip strength was assessed using an adjustable, hand-held dynamometer and standardized positioning (7). All subjects in the current study are Caucasians.

Hand radiographs

Posteroanterior hand radiographs were taken with separate exposures for each hand with the central ray on the third metacarpophalangeal joint. Each radiograph was read by one of two academically based bone and joint radiologists using an atlas of individual radiographic features developed for the Framingham Osteoarthritis Study (8). Fifteen joints for each hand, including five distal interphalangeal, four proximal interphalangeal, five metacarpophalangeal, and base of thumb joints, were evaluated for the presence of osteophytes, joint space narrowing, sclerosis, and cysts. Each joint was graded for overall radiographic osteoarthritis using a modified Kellgren and Lawrence scale graded 0–4, where 0 = none, 1 = questionable osteophyte(s) and/or questionable joint space narrowing, 2 = definite small osteophyte(s) and/or mild joint space narrowing, 3 = definite moderate osteophyte(s) and/or moderate joint space narrowing, and 4 = large osteophyte(s) and/or severe joint space narrowing (cysts or sclerosis may be present). This modification allowed for a joint to be scored as having definite osteoarthritis (grade 2 or higher) based on the presence of joint space narrowing alone, in the absence of osteophytes. The intraobserver reliability (kappa statistic) was 0.79 (p < 0.001) for reader 1 and 0.82 (p < 0.001) for reader 2; the kappa statistic for interobserver reliability was 0.65 (p < 0.001) for radiographic scoring (8).

Symptoms assessment

The interviewer-administered survey was conducted at the Framingham Study clinic. The survey included questions on major joint complaints. A specific question that permitted us to assess joint-specific symptoms was the following: “On most days, do you have pain, aching, or stiffness in any of your joints?” If the subject answered “yes” to this question, the interviewer then showed the subject a hand diagram that illustrated all distal interphalangeal, proximal interphalangeal, metacarpophalangeal, and base of thumb joints and asked the subject to mark the joint(s) that have pain, aching, or stiffness.

Grip strength measure

Grip strength, in kilograms, was added to the assessment midway through the Framingham examination cycle; thus, only subjects who attended the late phase of the examination had grip strength assessed using an adjustable, hand-held dynamometer. Subjects held the dynamometer with their right hand unless they were unable to perform the test with their right hand because of a history of a specific injury such as a previously broken wrist or stroke, in which case they used their left hand. Each subject sat in a straight-backed chair with his/her elbow bent at 90 degrees, with the forearm resting on the chair arm and wrist extended slightly past the chair arm. Grip strength was tested three times. Because there was occasionally a learning curve for participants and, when this occurred, the first grip measure was substantially lower, we used the maximal of the three measures of grip. Altogether, 695 subjects had grip strength measurements. Compared with those who did not have a grip strength measurement, subjects with grip strength assessed were generally younger and more likely to be women.

Functional status assessment

Self-reported functional limitation. We conceptualized functional limitation and disability as an aberration in the normal daily functional performance of an individual as suggested by Branch and Jette (9). Briefly, a questionnaire was administered to each participant by the interviewer in the Framingham clinic. Subjects were asked to report their normal day-to-day performance of six basic activities of daily living as defined by variables selected from several disability instruments (10–12). The activities involving hand function included eating and drinking, dressing, dialing a telephone, carrying a 10-pound (4.5-kg) bundle, and taking one’s own medication. Disability scores were assigned to each response (0 = no help needed, independent; 1 = uses a device, independent; 2 = human assistance needed, minimally dependent; and 3 = dependent). We classified a person’s self-reported functional performance as limited with any score greater than 0.

Additional questions on functional limitations in performing some daily activities were also administered, including a question on writing, handling, and fingering small objects. The response categories for these questions were as follows: 0 = no difficulty, 1 = a little difficulty, 2 = some difficulty, 3 = a lot of difficulty, 4 = unable to do, and 5 = don’t do on doctor’s advice. We defined subjects as having functional limitation if they had any difficulty in performing a task.
**Observed functional limitations.** In addition to self-reported functional limitations, the examination included an evaluation of observed functional performance. A trained nurse measured each participant’s ability to accomplish specific tasks according to a standard protocol. These tasks included dressing, transferring (getting in and out of a chair), walking 50 feet (15.2 m) in a corridor, carrying a 10-pound (4.5-kg) bundle for 10 feet (3.1 m), and pouring liquid from a pitcher into a glass. The functional ability measurement was scored with a range of 0–3, with 0 = no help needed, independent; 1 = uses device, independent; 2 = human assistance needed, minimally dependent; and 3 = dependent. We classified a person’s performance as limited with any score greater than 0.

**Statistical analysis**

All subjects with rheumatoid arthritis were excluded from the current analysis. These subjects were either taking second line drugs for arthritis and/or their hand radiographs showed marginal erosions or other findings highly suggestive of an inflammatory arthropathy. We classified symptomatic hand osteoarthritis based on both radiographic features and hand symptoms. Global radiographic features were graded 0–4 according to Kellgren and Lawrence criteria for each joint. A hand joint was considered as having symptomatic osteoarthritis if its Kellgren and Lawrence grade was ≥2 and if the same joint had symptoms defined as a positive response to the above question on “pain, aching, and stiffness.” If a subject had at least one hand joint with symptomatic osteoarthritis, he or she was classified as having symptomatic hand osteoarthritis.

Subjects’ ages were divided into four strata, 70–74, 75–79, 80–84, and 85 or more years. We first calculated the prevalence of symptomatic osteoarthritis for each hand joint for men and women, separately. We performed joint-based analysis to test whether symptomatic hand osteoarthritis was more prevalent among women than men and whether the disease increased with age by using the generalized estimating equation method (13). This method uses the joint as the unit of analysis but accounts for the correlation between multiple joints in an individual.

We examined the relation of symptomatic hand osteoarthritis to maximal grip strength and its impact on the functional performance of several daily activities. In these analyses, we excluded 44 subjects with a history of stroke and Parkinson’s disease because we hypothesized that the impact of these diseases on function would make it difficult to detect the effects of hand osteoarthritis in affected subjects. To evaluate the relation of symptomatic hand osteoarthritis to grip strength, we first calculated the sex-specific average of maximal grip strength for subjects with and without symptomatic hand osteoarthritis and then compared the difference in grip strength in subjects with and without symptomatic hand osteoarthritis using a multiple linear regression model, while adjusting for age and sex. In this analysis, the data on osteoarthritis status and maximal grip strength were taken from the same hand.

To assess the impact of symptomatic hand osteoarthritis on functional performance, we first calculated the prevalence of functional limitation according to the subjects’ symptomatic hand osteoarthritis status. Then we examined the association of hand osteoarthritis with functional limitation for activity using a logistic regression model while adjusting for age and sex.

It is quite possible that symptoms might be misclassified among the adjacent hand joints, especially the first metacarpophalangeal and base of thumb joints, the latter being a joint that many patients do not recognize. In a separate analysis, we also considered the thumb base carpometacarpal joint as having symptomatic osteoarthritis if 1) its Kellgren and Lawrence grade was 2 or more, 2) pain was recorded in either the base of thumb or first metacarpophalangeal joint, and 3) the Kellgren and Lawrence grade of the first metacarpophalangeal joint was less than 2. However, the results did not change materially when we used the above definition to classify osteoarthritis for the base of thumb joint.

**RESULTS**

Of the 1,166 subjects who participated in the Framingham Study at examination 22, 1,084 had hand radiographs, 1,099 answered the survey questionnaire on joint symptoms, and 1,166 completed the functional assessment. Overall, 1,041 subjects had the complete data for both hand radiographs and joint symptoms necessary to assess symptomatic hand osteoarthritis. Of those, nine subjects were excluded because of rheumatoid arthritis.

Demographic and anthropometric characteristics are shown in table 1. Of the participants, 64.2 percent were women and more than 80 percent were aged 75 or more years. Most of the participants completed high school or

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<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Men (n = 369)</th>
<th>Women (n = 663)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Categorical variables (%)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Age (years)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>71–74</td>
<td>18.2</td>
<td>17.2</td>
</tr>
<tr>
<td>75–79</td>
<td>47.7</td>
<td>39.4</td>
</tr>
<tr>
<td>80–84</td>
<td>20.6</td>
<td>24.9</td>
</tr>
<tr>
<td>≥85</td>
<td>13.6</td>
<td>18.6</td>
</tr>
<tr>
<td><strong>Education</strong></td>
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<td></td>
</tr>
<tr>
<td>Less than high school</td>
<td>34.3</td>
<td>30.8</td>
</tr>
<tr>
<td>High school graduate</td>
<td>32.6</td>
<td>35.5</td>
</tr>
<tr>
<td>Some college</td>
<td>25.4</td>
<td>29.9</td>
</tr>
<tr>
<td>College graduate</td>
<td>7.8</td>
<td>3.9</td>
</tr>
<tr>
<td><em><em>Continuous variables (mean (SD</em>))</em>*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Height (inches†)</td>
<td>68.2 (2.7)</td>
<td>62.9 (2.5)</td>
</tr>
<tr>
<td>Weight (pounds‡)</td>
<td>171.7 (28.9)</td>
<td>142.2 (29.0)</td>
</tr>
<tr>
<td>Body mass index (kg/m²)</td>
<td>25.9 (4.0)</td>
<td>25.2 (4.9)</td>
</tr>
</tbody>
</table>

* SD, standard deviation.
† One inch = 2.54 cm.
‡ One pound = 0.45 kg.
Thirty-one percent of the men (body mass index, $\geq 27.8$ kg/m$^2$) and 28.6 percent of the women (body mass index, $\geq 27.2$ kg/m$^2$) were overweight (14).

The prevalence of symptomatic hand osteoarthritis for each joint is presented separately for men and women in figure 1. Symptomatic osteoarthritis occurred more frequently among distal interphalangeal, proximal interphalangeal, and base of thumb joints. About 13.3 percent of men (95 percent confidence interval (CI): 9.8, 16.7) and 26.2 percent of women (95 percent CI: 22.9, 29.6) had at least one hand joint affected by symptomatic osteoarthritis, and 7 percent of men and 16 percent of women had bilateral symptomatic hand osteoarthritis. The presence of pain among the joints with a Kellgren and Lawrence grade 2, 3, or 4 radiographic osteoarthritis in men was 1.4, 2.7, or 5.0 times higher than that among the joints with a Kellgren and Lawrence grade of less than 2; the corresponding numbers in women were 2.0, 3.4, and 4.3, respectively.

The prevalence of symptomatic osteoarthritis in women was higher than that in men in almost every hand joint, with an overall odds ratio being 3.1 (95 percent CI: 1.2, 7.9). The prevalence of symptomatic hand osteoarthritis did not increase with age in either men or women. For men, it was 16.4, 11.9, and 13.5 percent in the age groups 71–74, 75–79,

**FIGURE 1.** Prevalence (%) of symptomatic hand osteoarthritis by sex among the participants in the Framingham Study, 1992–1993. DIP, distal interphalangeal; MCP, metacarpophalangeal; PIP, proximal interphalangeal.
Symptomatic Hand Osteoarthritis and Functional Limitations

Subjects with symptomatic hand osteoarthritis had weaker maximal grip strength compared with those without symptomatic hand osteoarthritis (table 2). For men, the average maximal grip strength was 28.7 kg among subjects with symptomatic hand osteoarthritis and 31.8 kg among subjects without osteoarthritis \((p < 0.02)\). The corresponding average maximal grip strength in women was 17.6 and 19.6 kg \((p < 0.01)\), respectively.

The prevalence of symptomatic hand osteoarthritis in conjunction with at least one functional impairment either reported by the study participant or observed by the interviewer was 9 percent in men and 17 percent in women. As shown in table 3, compared with those without symptomatic osteoarthritis, subjects with symptomatic hand osteoarthritis had more difficulties in carrying a bundle, in writing, and in handling or fingering small objects. In the observed functional test, subjects with symptomatic hand osteoarthritis also showed more difficulties in carrying a 10-pound (4.5-kg) bundle compared with those without disease.

DISCUSSION

In this population-based study, we found that symptomatic hand osteoarthritis is a common disorder among this elderly Caucasian population, especially among women. The prevalence, however, did not increase with age among this elderly population. The most commonly involved joints were the distal interphalangeal and proximal interphalangeal joints, followed by the base of thumb joint. We also found that symptomatic hand osteoarthritis is associated with weak grip strength and limits several daily functional activities.

Unlike studies of knee and hip osteoarthritis, epidemiologic studies of hand osteoarthritis, especially symptomatic hand osteoarthritis, are limited. To our knowledge, no population-based data are available on the prevalence of symptomatic hand osteoarthritis in the United States. The prevalence of symptomatic hand osteoarthritis in our study was generated from a population-based study. Although previous studies have suggested that the prevalence or incidence of major diseases in the Framingham Study, such as cardiovascular disease, cancer, and hip fracture, is similar to that in the Caucasian population in the United States (15–18), we are uncertain if our findings can be extrapolated to


<table>
<thead>
<tr>
<th>Status of symptomatic osteoarthritis of the hand</th>
<th>No. of subjects*</th>
<th>Mean of maximal grip strength (kg)</th>
<th>Age-adjusted difference in maximal grip strength (kg)</th>
<th>95% CI†</th>
</tr>
</thead>
<tbody>
<tr>
<td>Men</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>27</td>
<td>28.7</td>
<td>3.1</td>
<td>1.8, 4.4</td>
</tr>
<tr>
<td>No</td>
<td>225</td>
<td>31.8</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Women</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>89</td>
<td>17.6</td>
<td>1.9</td>
<td>1.4, 2.4</td>
</tr>
<tr>
<td>No</td>
<td>310</td>
<td>19.6</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* Forty-four subjects were excluded from the analysis because of stroke or Parkinson’s disease.
† CI, confidence interval.


<table>
<thead>
<tr>
<th>Selected activities</th>
<th>Symptomatic hand osteoarthritis (n = 207)</th>
<th>No symptomatic hand osteoarthritis (n = 735)</th>
<th>Age-adjusted odds ratio</th>
<th>95% confidence interval</th>
</tr>
</thead>
<tbody>
<tr>
<td>Self-reported functional limitation</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dressing</td>
<td>10</td>
<td>44</td>
<td>0.7</td>
<td>0.3, 1.4</td>
</tr>
<tr>
<td>Eating and drinking</td>
<td>6</td>
<td>28</td>
<td>0.6</td>
<td>0.2, 1.5</td>
</tr>
<tr>
<td>Carrying a bundle (10 pounds)†</td>
<td>39</td>
<td>83</td>
<td>1.7</td>
<td>1.1, 2.7</td>
</tr>
<tr>
<td>Using a telephone</td>
<td>9</td>
<td>37</td>
<td>0.7</td>
<td>0.3, 1.6</td>
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<tr>
<td>Taking own medication</td>
<td>18</td>
<td>65</td>
<td>0.9</td>
<td>0.5, 1.7</td>
</tr>
<tr>
<td>Writing, handling, or fingering small objects</td>
<td>115</td>
<td>192</td>
<td>3.4</td>
<td>2.4, 4.6</td>
</tr>
<tr>
<td>Observed functional performance</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dressing</td>
<td>7</td>
<td>40</td>
<td>0.5</td>
<td>0.2, 1.1</td>
</tr>
<tr>
<td>Getting in and out of a chair</td>
<td>24</td>
<td>54</td>
<td>1.5</td>
<td>0.9, 2.6</td>
</tr>
<tr>
<td>Carrying a bundle (10 pounds)†</td>
<td>36</td>
<td>78</td>
<td>1.6</td>
<td>1.0, 2.6</td>
</tr>
<tr>
<td>Pouring water from pitcher to glass</td>
<td>9</td>
<td>36</td>
<td>0.7</td>
<td>0.3, 1.6</td>
</tr>
</tbody>
</table>

* Ninety subjects were excluded from the analysis because of stroke, Parkinson’s disease, or missing data on functional performance.
† Ten pounds = 4.5 kg.

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the elderly Caucasian population in the United States. Thus, further descriptive epidemiologic studies on symptomatic hand osteoarthritis are needed so that a complete picture of this disease will be available for the US population.

Many people may think that symptomatic hand osteoarthritis is not a common disease, because patients with hand osteoarthritis seldom seek medical care. In this study, we found that 13.2 percent of men and 26.2 percent of women aged 70 or more years had at least one joint with symptomatic osteoarthritis. Among subjects within the same age range in the Framingham Study, the prevalence of symptomatic hand osteoarthritis was higher than that of symptomatic knee osteoarthritis (19), whereas care seeking for symptomatic hand osteoarthritis was substantially less frequent than for symptomatic knee osteoarthritis in the Fallon Health Maintenance Organization (6). These results suggest that many subjects with symptomatic hand osteoarthritis among the elderly population may not seek medical care.

In the present study, the prevalence of symptomatic hand osteoarthritis does not increase monotonically with age among the elderly population. In fact, studies have shown that the incidence and prevalence of symptomatic osteoarthritis appear to level off or to decline in both sexes at around age 80 years (6). Other investigators also found that the prevalence of foot pain was less common among those aged 85 or more years than among those immediately younger ones (6, 20). This pattern may be related to sedentary activity levels in the older age groups, resulting in less joint injury and/or decreased joint pain. The elderly may have increased pain thresholds, which would reduce the number of reported joint symptoms (21).

Previous studies have reported that clinical signs and symptoms correlate poorly with radiographic change in the population (22). In the current study, the prevalence of radiographically diagnosed hand osteoarthritis was 88.6 percent in men and 94.4 percent in women. However, of those who had radiographic hand osteoarthritis, only 8.9 percent of the men and 17 percent of the women reported clinical symptoms. Because the percentages are small, studies focused on radiographic hand osteoarthritis might not help us to fully understand the etiology and impact of symptomatic hand osteoarthritis. As such, more epidemiologic studies on the occurrence, risk factors, and impact of symptomatic hand osteoarthritis are needed.

With the exception of grip strength, few, if any, epidemiologic studies have systematically assessed the impact of symptomatic hand osteoarthritis in relation to functional limitation (23). Of several hand functional activities that were assessed in the current study, symptomatic hand osteoarthritis affected only writing, handling or fingering small objects, and carrying a 10-pound (4.5-kg) bundle. It did not have any effect on dressing, eating and drinking, using the telephone, taking medication, or pouring liquid from pitcher to glass. These results suggest that symptomatic hand osteoarthritis limits mainly the activities that require precise pincer grip (fingering small objects; odds ratio (OR) = 3.4, 95 percent CI: 2.4, 4.6) more than power grasp (e.g., gripping pitcher: OR = 0.7, 95 percent CI: 0.3, 1.6; carrying a bundle; OR = 1.7, 95 percent CI: 1.1, 2.7).

One prospective cohort study reported that high maximal grip strength is associated with an increased risk of radiographic hand osteoarthritis, especially of the proximal interphalangeal joints, metacarpophalangeal joints, and thumb base (24). However, after subjects developed symptomatic hand osteoarthritis, their grip strength is significantly weaker than the grip strength of those without the disease, and the magnitude of difference in grip strength is not trivial. In the multiple linear regression model where both age and the status of symptomatic hand osteoarthritis were included to predict maximal grip strength, the beta coefficient for the status of symptomatic hand osteoarthritis is equivalent to that of a 5-year age difference. Among elderly people, grip strength plays an important role in the performance of various daily activities. Grip strength has been frequently used in clinical settings to assess sensorimotor deficits. Adequate grip strength is a prerequisite not only for good hand function, such as grasping heavy objects (25), but also for assisting the leg extensors in pulling or pushing the body mass upward against gravity when climbing stairs or rising from a chair. Thus, weak grip strength among subjects with symptomatic hand osteoarthritis could have an impact on their quality of life.

Radiographs in our study were read by two expert readers whose intraobserver reliability was excellent. Interobserver reliability (kappa = 0.65) was in the “good” range (26). Reading hand radiographs for osteoarthritis is challenging, as hand joints are small and features are often difficult to define well. Previous studies with more than one reader have generally not reported kappa statistics, even when the definition of osteoarthritis is based on a dichotomized Kellgren and Lawrence score; thus, it is hard to compare our results with those of others. However, when we used an intracorrelation coefficient to assess the agreement of Kellgren and Lawrence scores on an ordinal scale of 0–4, our result (intracorrelation coefficient = 0.88) was similar to or even better than those reported previously (27, 28). In addition, the overall proportion of agreement in radiograph reading between the two readers in our study was 87.7 percent, and the disagreement did not occur in any particular direction, suggesting that there was no systemic bias in radiograph reading between the two readers.

Our study has some limitations. Data on hand-related comorbidities other than rheumatoid arthritis, stroke, or Parkinson’s disease, such as peripheral nerve syndromes, cervicobrachial syndrome, and rotator cuff rupture which can also influence grip strength or functional performance, were not collected. However, for these diseases to confound our estimates, they would have to not only affect functional performance but also be associated with symptomatic hand osteoarthritis. Given the paucity of data on the prevalence of these disorders and the unlikely association with hand osteoarthritis, we believe that the effect of symptomatic hand osteoarthritis on grip strength and other functional performance should be accurate. Second, data on the current use of analgesic and antirheumatic drugs for conditions that might affect the measurement of grip strength and functional performance were unavailable. Nevertheless, if adjustment were made for the effects of these medications, the real
impact of symptomatic hand osteoarthritis on grip strength or on functional impairment would be greater.

In conclusion, there has been a remarkable paucity of data on the descriptive epidemiology of symptomatic hand osteoarthritis. We found that symptomatic hand osteoarthritis is a common disease among an elderly population. Further, subjects with symptomatic hand osteoarthritis have weaker grip strength and often have impairment in hand functions that require either precise pincer grip or power grip.

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REFERENCES