Hand functions in systemic lupus erythematosus: a comparative study with rheumatoid arthritis patients and healthy subjects

Songül BAĞLAN YENTÜR1,*, Zeynep TUNA1, Oğuzhan METE2, Ahmet GÖKKURT1, Nurten Gizem TORE1, Hamit KüÇÜK3, Berna GÖKER4, Deran OSKAY1

1Department of Physiotherapy and Rehabilitation, Faculty of Health Sciences, Gazi University, Ankara, Turkey
2Department of Physiotherapy and Rehabilitation, Faculty of Health Sciences, Yıldırım Beyazıt University, Ankara, Turkey
3Erzurum Regional Education Research Hospital, Erzurum, Turkey
4Division of Rheumatology, Department of Internal Medicine, Gazi University Hospital, Ankara, Turkey

Received: 21.03.2018  ●  Accepted/Published Online: 19.06.2018  ●  Final Version: 16.08.2018

Background/aim: Systemic lupus erythematosus (SLE) frequently affects the small joints of the hand and may result in difficulty in activities of daily living. There are very few studies evaluating the problems encountered in the hands in patients with SLE. The aim of this study is to evaluate hand functions in patients with SLE and compare them with rheumatoid arthritis (RA) patients and healthy subjects.

Materials and methods: A total 46 female patients meeting the SLE classification criteria were recruited. Similarly, 51 female RA patients and 46 healthy female subjects served as the control groups. To assess the upper extremity disability level, the Disability Arm Shoulder and Hand Questionnaire (DASH) was used. Some functional performances such as hand grip and pinch strength were evaluated using a dynamometer and the Nine Hole Peg Test (NHPT), respectively.

Results: Hand functions were found to be impaired in both SLE and RA patients when compared to healthy controls. In addition, patients with SLE showed better performance in the NHPT, hand grip, and pinch strength than RA patients (P < 0.05). However, the patient-reported disability level was similar in both patient groups (P > 0.05).

Conclusion: Similar to patients with RA, hand functions are significantly impaired in patients with SLE in daily activities.

Key words: Systemic lupus erythematosus, rheumatoid arthritis, hand functions

1. Introduction
Systemic lupus erythematosus (SLE) is a multisystemic chronic autoimmune disease characterized by the formation of antibodies and immune complexes that attack self-tissues. It may affect almost any system in the body, which results in diverse clinical manifestations such as fatigue, skin changes, joint pain, and stiffness (1). Articular complaints are observed in more than 90% of patients and the most commonly affected joints are the small joints of the hands and fingers (2).

Healthy hand function is defined as normal stability, muscle strength, range of motion, and motor and sensory function with no pain (3). The spectrum of articular involvement in SLE ranges from mild joint pain to severe deformity referred to as Jaccoud’s arthropathy (4). Although arthritis is usually nonerosive in SLE, reduced muscle strength and chronic joint pain may cause difficulties and activity limitations in patients with SLE.

Furthermore, articular complaints in SLE patients result in functional disabilities, limitations, and reduced quality of life (5).

Rheumatoid arthritis (RA) is a well-known hand-disabling rheumatic disease as it causes severe involvement of hands and fingers. Synovial inflammation in RA causes progressive joint and tendon damage, which impairs hand functions and quality of life (6). Studies suggested that patients with SLE have impairments in the activities of daily living, decreased productivity, and losses in the work force (7,8). Although a number of studies have investigated radiographic hand involvement in SLE, there are very few studies on hand functions (9,10). Moreover, there is no comparative study evaluating hand functions in SLE and RA. The aim of this study was to evaluate hand functions in patients with SLE and compare the findings with the hand functions of patients with RA and healthy subjects.

* Correspondence: songulbaglan23@hotmail.com
2. Materials and methods

2.1. Subjects
Forty-six female SLE patients with ages ranging from 18 to 65 years who met the Systemic Lupus International Collaborating Clinics SLE classification criteria were included in the study (11). Similarly, 46 healthy female subjects and 51 female RA patients who were diagnosed according to the ACR/EULAR 2010 criteria were included as control groups (12). Subjects who were illiterate and pregnant and those with cognitive impairment or upper extremity trauma were excluded from the study. Patients with any other systemic or rheumatic diseases were also excluded, especially diseases that may affect hand functions like scleroderma or Raynaud’s disease. Outpatients with RA with DAS-28 score below 2.4 (low disease activity) were directed to participate by the rheumatologist in the study. Additional criteria were established as having no changes in medical treatment and no inflammation, having no biological agent or high-dose steroid treatment, or being without any increase in steroid dosage already being used within the last month. Patients hospitalized in the previous 3 months were excluded from the study. Additionally, patients with any severe hand deformity that impaired gripping or pinching movements were also excluded. Clinical disease features including duration of disease, systemic involvements, current medications, and demographic data were recorded. The study design was approved by the ethics committee with date and number 11/05/2016-06 and written informed consent was obtained from all the participants.

2.2. Evaluation of hand functions and disability
To determine the functional status of the hand, grip strength, and speed-based performance, in addition to patient-reported questionnaires, gross grip and pinch strength tests and the Nine-Hole Peg Test (NHPT) were carried out.

Gross grip strength was measured using a handheld dynamometer. Three different pinch strengths (lateral, bipod, and tripod) were measured using a pinch meter. The grip strength assessments were performed with the patient in an upright position, sitting in a chair with the back supported. Each measurement was repeated three times for both hands. During the assessments, maximum care was given to ensure that the patient’s arm was in adduction with the elbow in a flexion of 90° and that the patient was not receiving support from anywhere (13).

The NHPT was carried out to evaluate dexterity. For this test, participants were asked to place and remove nine pegs into the holes in a pegboard as quickly as possible and the time used for placing and removing the pegs was recorded (14).

To assess the activities of daily living and the functional status of the patients, the validated Turkish version of Disabilities of the Arm, Shoulder and Hand Questionnaire (DASH-T) was used (15).

DASH-T assesses hand, arm, and shoulder functions disregarding the use of the extremity properly. A score between 0 and 100 is obtained; a higher score indicates greater disability. The first part of the questionnaire consists of a total of 30 questions, which includes 21 questions regarding physical function; 6 questions regarding pain, sensory problems, strength, and mobility; and 3 questions concerning social life. The second part has a total of 8 questions, 4 of which are related to sports and music performance and 4 regarding work (15). DASH was found to be valid to measure hand disability level in RA (16).

2.3. Statistical analysis
Statistical analyses were performed using IBM SPSS 22.0 (IBM Corp., Armonk, NY, USA). The variables were investigated to determine whether or not they were normally distributed. Descriptive analyses were presented using medians and interquartile ranges for the nonnormally distributed variables and using means and standard deviations for the normally distributed variables. Variables that were nonnormally distributed were analyzed using the Kruskal–Wallis test. Post hoc analyses of the data with significant differences were performed with the Mann–Whitney U test and Bonferroni correction was performed. The homogeneity of the numerical data with normal distribution was examined by the Levene test. Homogeneously distributed data were analyzed using one-way ANOVA and the data that were not homogeneously distributed were analyzed using a Welch t-test. Post hoc analyses of the data with significant differences were performed using the Tukey test for one-way ANOVA and the Tamhane test for the Welch t-test. Statistical significance was set at P < 0.05.

3. Results
The study included 46 patients with SLE (mean age: 38.4 ± 10.4 years), 51 patients with RA (mean age: 54.5 ± 12.2 years), and 46 healthy subjects (mean age: 37.2 ± 8.1 years). Disease durations in the patients with SLE and RA were 84 (48–120) months and 94 (22–132) months, respectively. The right hand was the dominant extremity in 97.8% of the RA patients, 88.2% of the SLE patients, and 95.6% of the healthy subjects.

Grip and pinch strengths and NHPT results revealed that the SLE and RA patients had poorer hand functions with respect to the healthy subjects in both dominant and nondominant extremities. However, the degree of impairment in the patients with SLE was not as much as that of the patients with RA (Table). Likewise, the patient-reported functional assessment with DASH-T showed a significant impairment in the SLE and RA patients compared to the healthy subjects. However, DASH-T revealed similar impairments in the SLE and RA patients.
While the DASH-T score was 18.33 (10.34–36.66) in the SLE group, it was 24.14 (15–43.33) in the RA group and 4.16 (0.83–10.83) in the healthy group (P = 0.001).

4. Discussion

According to our results, hand functions, based on strength and speed-based hand performance tests, were found to be better in the patients with SLE than the ones with RA but they were worse than in the healthy subjects. However, the patient-reported disability levels in both patient groups were found to be similar.

SLE is a rheumatic disease in which inflammatory joint involvement affects the hands primarily, but contrary to RA, it does not cause erosive changes (4). Piga et al. reported that the rate of hand deformity is 27% in patients with SLE (18). According to many authors, involvement of the hands in SLE is different from RA (18,19). Joint destruction is the cause of deformities seen in RA, whereas the deformity seen in SLE is caused by the reduced support of the periarticular structures and does not cause permanent damage (4). In our study, the patients with SLE had statistically significantly better objective grip strength than the patients with RA and this result may be due to that difference in hand joint involvement in the two diseases. Similar to our study, Johnsson et al. found that SLE patients encounter more hand problems and face more difficulties in daily life when compared to healthy controls (9,10). However, RA patients with frequent hand involvement were not included as a control group in that study. Thus, our results may contribute to the literature in this respect.

Although the grip strength and agility test results of the patients with SLE participating in our study were better than those of the patients with RA, the results of the patient-reported questionnaires of the two groups were found to be similar. The conclusion that could be drawn from this result can be that patients with SLE have limited participation in everyday life, similar to patients with RA.

From a general perspective, SLE, like RA, is a disease with systemic involvement, fatigue, and psychological disorders. A literature search showed that the reasons leading to unwillingness in engaging in activities may stem from the global health status and disease-related impairments of SLE patients. Authors reported that patients complained about general problems such as bad weather conditions and lack of motivation and the factors concerning disease-related symptoms such as articular manifestations, fatigue, systemic involvement, and exhaustion (19). Typically, objective findings might be milder than subjective complaints in patients with SLE and this provides evidence that some disease-related symptoms such as psychological distress and fatigue have an effect on functional status (4). On the other hand, similar results were obtained from RA patients in patient-reported questionnaires in our study and these results may also be due to the disease-related symptoms mentioned above.
Considering that a person is a biopsychosocial entity, evaluations based solely on the body structure and functions of patients is not enough; environmental factors, personal factors, and participation should also be assessed (3). For this reason, the most important limitation of our study is that we did not examine biopsychosocial parameters such as disease activity, fatigue, anxiety, and depression, which contribute to the hand function of SLE patients. As for the tools used in this study, the hand-held dynamometer and NHPT are the tools that are validated in functional hand assessment. In order to obtain clearer information in a holistic approach, our study should be supported by further studies evaluating other exploratory parameters. Last but not least, as SLE is not a very common rheumatic disease, the sample size of 46 patients might be regarded as a point to strengthen the reliability of the results of our study (20).

In light of the findings obtained from this study, the patients with SLE were found to have more impairments in hand functions when compared to the healthy controls and fewer impairments in hand functions when compared to the patients with RA. Although the results of dexterity tests performed on the patients with SLE were better than those of the RA patients, it may be concluded that patients with SLE can have as much difficulty in participating in everyday life as patients with RA. There is a need for further studies that assess the participation of patients in everyday life from a multidimensional perspective to obtain results that are more meaningful to the treatment of patients with conditions like SLE and RA. It should also be noted that hand therapists should be aware of the presence of hand disabilities in SLE and RA patients. As a result of this study, it can be suggested that the inclusion of tailored hand and upper extremity therapy approaches in the rehabilitation programs of patients with SLE contributes greatly to the treatment of these patients.

References


