Effect of rheumatoid arthritis on strength, dexterity, coordination and functional status of the hand: relationship with magnetic resonance imaging findings

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ABSTRACT

Objective: To evaluate the effect of rheumatoid arthritis (RA) on strength, dexterity, coordination and functional status of the hand and to determine the relation with magnetic resonance imaging (MRI) findings.
Materials and Methods: Thirty-eight patients with RA and thirty-three controls were included in the study. There were five drop-outs in RA group. Pain was assessed by visual analog scale. Painful and swollen joints of the dominant hand were recorded. Hand deformities of the patients were noted. Hand grip strength and pinch strength of the dominant hand were evaluated. Hand disability was assessed by Duruoz hand index (DHI) and the Purdue pegboard test was used for assessment of coordination and dexterity. MRI of the dominant wrist and hand was performed in RA group. MRI scans were evaluated for synovitis, tenosynovitis, bone erosion and bone edema.
Results: Demographic characteristics were similar between groups. While DHI scores were significantly higher (p=0.000), Purdue pegboard test scores were significantly lower in RA group in comparison to control group (p=0.000). Bone edema and synovitis scores were significantly higher in patients with longer disease duration (p=0.025, p=0.006 respectively). There were significant negative correlation between grip strength, pinch strength subgroups and tenosynovitis scores (p=0.001, p=0.001). When the Purdue pegboard scores were lower, tenosynovitis scores were significantly higher (p=0.019, p=0.013, p=0.043). There was a significant positive correlation between DHI score and tenosynovitis score (p=0.003).
Conclusion: This study showed that RA has significant negative impact on hand function and dexterity and the parameters used in the evaluation of hand function are mainly associated with tenosynovitis scores. Since tenosynovitis is a common pathology in RA, MRI can be used as a supportive method in early diagnosis of tenosynovitis and may be useful in identification of patients requiring aggressive treatment.

Keywords: Hand; MRI; Rheumatoid arthritis; Tenosynovitis; Dexterity.

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INTRODUCTION

Rheumatoid arthritis (RA) is a chronic, systemic, autoimmune disease of unknown etiology leading to progressive joint destruction and difficulties in performing daily living activities[1]. It is the most common inflammatory arthritis, affecting ~ % 1 of the population[2]. RA affects especially synovial joints and tendons, so primarily is an inflammatory synovitis rather than arthritis. Inflammation of the synovial membrane leads to formation of highly cellular inflammatory pannus tissue. Pannus grows over and infiltrates cartilage, tendons and ligaments, which result in erosion of cartilage and subchondral bone, distruption of ligamentous insertions and impaired tendon glide. These factors combine to cause pain, stiffness and deformities seen in RA[3].

Hand deformity and loss of joint function are common in patients with RA and it is estimated that the hands and wrists are affected in 80% to 90% of the patients with RA[4]. Hand involvement is one of the major determinant of disease outcome affecting the ability to perform activities of daily living and other functional activities[5,6]. Up to 30% of patients have radiographic

evidence of disease at the time of diagnosis, and over 60% have radiographic joint changes within 2 years of diagnosis. So accurate measurement of hand functions using objective and easy methods are important in RA patients[5,7]. An important aim of treatment in RA is to control disease activity, prevent joint deformities, preserve function, and thus maintain or improve quality of life[4].

Hand and wrist involvement is of great importance in RA[8]. Diagnosing RA during its early stage is crucial, given the implications for therapeutic management[9]. Within the first year after symptom onset, joint synovial inflammation progresses to erosion of cartilage and bone in up to 47% of patients[10]. Structural joint damage has been traditionally evaluated by radiological images. However, only the late signs of preceding disease activity can be visualised by radiography[11]. Magnetic resonance imaging (MRI) is an imaging method that can exceed many limitations of conventional radiography. MRI can detect the presence of inflammation in the synovium, tenosynovium, and probably the periarticular bone earlier in RA[10,11]. Given these advantages, MRI has a major potential as an outcome measure in RA clinical trials and investigations.

The aim of this study is to evaluate the effect of RA on pinch and grip strengths, range of motion (ROM), hand dexterity, coordination, and performing daily activities and to determine the relation of MRI findings with these parameters.

MATERIALS AND METHODS

Thirty-eight consecutive patients with RA, according to the 1987 revised American College of Rheumatology (ACR) criteria[12], visiting the outpatient department of Rheumatology were enrolled in the study. The control group comprised 33 age- and sex-matched subjects. The exclusion criteria were the presence of other hand and wrist diseases such as entrapment neuropathy, tendinitis, history of major hand trauma or surgery of the hand, or of neurologic diseases causing sequelae in the hand. Those with a psychiatric disorder were also not included in the study. The control group was constituted from the non-rheumatoid patients who attended the outpatient clinic due to low back pain or knee pain, having no clinical symptoms referable to hand joints. There were five drop-outs in the RA group. One patient due to body weight over the safety restriction of MRI table, two patients due to claustrophobia and two patients due to joint contractures causing difficulty in positioning in MRI machine, could not undergo MR imaging. The study was completed with 33 patients.

All participants' demographic variables including age, gender, weight, height, dominant hand, occupation, hand overuse history and comorbid diseases were recorded. Hand overuse was defined as hobbies and jobs required repetitive and frequent usage of hands. All patients in the RA group were receiving disease-modifying treatments during the study. Duration of disease and morning stiffness were also recorded. According to rheumatoid factor (RF) levels, patients were classified as RF positive and RF negative.

Presence of hand pain was evaluated on a 0-10 visual analog scale (VAS). Painful and swollen joints of the dominant hand were recorded. Deformities of the wrist and fingers were defined. ROM was measured in degrees with a standard finger goniometer. For the wrist, four movements were assessed: extension, flexion, radial and ulnar deviation. Mobility of each finger was assessed by measuring flexion and extension movements at the metacarpophalangeal (MCP), proximal interphalangeal (PIP) and distal interphalangeal (DIP) joints. Total ROM was calculated for each finger[3].

Hand grip strength was measured on the dominant hand using Jamar hydraulic hand dynamometer. The subject's arm was positioned according to the American Society of Hand Therapist's recommendations. The procedure was repeated three times. The average reading was recorded in kilograms. Pinch strength was measured with Jamar hydraulic pinch gauge which assesses tip to tip pinch between the thumb and index finger, lateral pinch where the thumb is clasped against the radial side of the index finger (strongest pinch grip) and three jaw chuck where the pulp of the thumb is pinched against the pulps of the index and middle fingers. As for the power grip, the test was repeated three times and the average reading was recorded in kilograms[13].

Purdue Pegboard test was used for evaluating fine coordination and dexterity of the hand. Four subtests comprise the test; right hand (RH), left hand (LH), both hands (BH) and assembly. Each stage of the test was administered three times[14]. Hand disability was assessed by Duruöz hand index (DHI). DHI is an 18-item questionnaire concerning daily living activities, each question being scored from 0 (performed without difficulty) to 5 (impossible to do). Disability was

recorded as the total score obtained by adding the scores of all questions (range 0-90)[15]. All assessments were performed by the same physiatrist.

MR imaging of the dominant wrist and hand including MCP joints, was performed with a 1.5-Tesla magnet system in RA group. MRI of control group could not be obtained due to ethical issues. The imaging protocol comprised firstly, fat suppressed axial T1-weighted spin echo (SE), coronal proton-density weighted, sagittal T2 weighted gradient echo (GRE) and coronal T2 weighted GRE sequences, followed by fat suppressed coronal and axial T1 weighted SE sequences after injection of contrast agent. Two patients refused contrast agent so MRI scanning was completed without it. These patients were not excluded from the study. A single radiologist who was blinded to the physical examination results, reviewed scan images for bone edema, bone erosion, synovitis and tenosynovitis. MRI scans were evaluated according to the system developed and validated by McQueen et al[10]. Outcome Measures in RA Clinical Trials (OMERACT) RA MRI score (RAMRIS) system was also taken into account during evaluation of scan images[16,17].

Bone erosion: 15 bony sites were evaluated for erosions. These were distal radius, distal ulna, eight carpal bones and the bases of the five metacarpal bones. Erosions were scored, on size as 0= none or < 2mm in diameter, 1= 2-4mm in diameter and 2=> 4mm in diameter. Total erosion score was calculated (maximum possible score = 30) [9,10].

Bone edema: Bone marrow edema was scored at the same sites for bone erosion; 0 for none or one bone minimal effected, 1 for minor edema involving < 50% of the bone (one carpal bone, distal radius, distal ulna and one basis of metacarpal bone) and 2 for gross edema involving > 50% of the bone marrow). The total bone marrow edema score was obtained from the sum of all scores (maximum possible score = 30) [9,10].

Synovitis: Synovitis was assessed at the distal radioulnar joint, radiocarpal joint (ulnar aspect), radiocarpal joint (radial aspect), intercarpal joint (between the proximal and the distal carpal rows), and MCP joints. Synovitis was scored using synovial thickening (0 for < 2 mm, 1 for 2–4 mm and 2 for > 4 mm). Total synovitis score was calculated (maximum possible score = 10) [9,10].

Tenosynovitis: Six extensor tendon groups: (I) extensor pollicis brevis, abductor pollicis longus; (II) extensor carpi radialis brevis, extensor carpi radialis longus; (III) extensor pollicis longus; (IV) extensor digitorum communis, extensor indicis; (V) extensor digiti minimi; (VI) extensor carpi ulnaris and three flexor tendon groups: (1) the flexor carpi ulnaris tendon; (2) the flexor digitorum superficialis and profundus; (3) the flexor carpi radialis were scored. Grading was as follows: grade 0 indicated no tendon sheath enhancement; grade 1, tendon sheath enhancement without tendon sheath thickening and grade 2, tendon sheath enhancement with tendon sheath thickening. Total tenosynovitis score was calculated (maximum possible score = 18) [9,10].

The ethics committee of hospital approved the study and all participants were given a written informed consent.

STATISTICAL ANALYSIS

Data were analysed by using the statistical package for social sciences (SPSS) version 11.5 for Windows. All numerical data were expressed as the mean ± standard deviation. The normality of variables was evaluated by the Shapiro–Wilk statistics. Statistical comparisons between the measures or groups were done by using the Student's t test or the Mann–Whitney U test. Correlation coefficients were calculated by the Spearman method. For categorical comparisons Chi-square and Fisher exact tests were used. Statistical significance was set at $p< 0.05$.

RESULTS

Thirty-three patients with a mean age of 46.4 ± 11.1 years and thirty-three controls with a mean age of 46.3 ± 10.9 years were enrolled in the study. Demographic characteristics were similar between RA and control groups ($p>0.05$). Fifteen patients had at least one deformity (45.5%). Five patients had ulnar deviation of the wrist, one had MCP subluxation, two had ulnar deviation of MCP, three had swan neck deformity, five had boutonniere deformity and two had type one thumb deformity (boutonniere deformity of the thumb). Fourteen patients in the RA group had hand overuse history. Nine of the patients had history of sewing and making lace regularly and five had jobs required repetitive use of hands such as carpet weaving, carpentry and upholstery. Descriptive characteristics of the groups are given in Table I.

We compared hand function of the patients with

TABLE I. DESCRIPTIVE CHARACTERISTICS OF RA AND CONTROL GROUPS

	RA group (n=33)	Control group (n=33)	p
Age, mean± SD, years	46.4 ± 11.1	46.3 ± 10.9	0.964
BMI, mean± SD, kg/m2	27.9 ± 5.5	27.8 ± 3.5	0.892
Gender, n (%)			
Female	24 (72.7)	24 (72.7)	1.000
Male	9 (27.3)	9 (27.3)	
Dominant hand, n, (%)			
Right	29 (87.9)	32 (97.0)	0.355
Left	4 (12.1)	1 (3.0)	
Occupation, n, (%)			
Housewife	21 (63.6)	20 (60.6)	
Officer	3 (9.1)	9 (27.3)	0.084
Worker	9 (27.3)	4 (12.1)	
Hands overuse history, n, (%)			
Positive	14 (42.4)	10 (30.3)	0.306
Negative	19 (57.6)	23 (69.7)	
Deformity, n, (%)			
Yes	15 (45.5)	–	
No	18 (54.5)	33 (100)	
Ulnar deviation of wrist, n, (%)	5	–	
MCP subluxation, n, (%)	1	–	
Ulnar deviation of MCP, n, (%)	2	–	
Swan neck deformity, n, (%)	3	–	
Boutonniere deformity, n, (%)	5	–	
Type 1 thumb deformity, n, (%)	2	–	

Type 1 thumb deformity (boutonniere deformity of the thumb)

hand deformity with the patients without deformity. Grip strength, tip to tip pinch strength, three jaw chuck strength, purdue pegboard right hand, purdue pegboard both hand, purdue pegboard assembly and DHI scores were significantly lower in the patients with hand deformities in comparison to the patients without deformity (p=0.02, p=0.05, p=0.22, p=0.04, p=0.04, p=0.03, p=0.04 respectively). Grip strength, pinch strength subgroups, purdue pegboard subgroups and DHI scores did not differ between groups according to hand overuse history (p>0.05).

Wrist ROM except for ulnar deviation and second to fifth finger ROM, were significantly decreased in RA group. Thumb adduction was in normal ranges in all patients. Only two patients had limitations in thumb flexion, MCP extension and interphalangeal (IP) extension. Statistical analysis for these parameters were not performed since groups were too small. Hand disability was assessed by DHI. DHI scores were 16.6 ± 13.2 and 0.3±0.5 in the patient and control groups, respectively. DHI scores were significantly higher in the RA group. ROM and DHI scores of the groups are shown in Table II. Hand grip strength and pinch strength were significantly decreased in RA group (p=0.000). For evaluating fine coordination and dexterity of the hand, the Purdue Pegboard test was used. All subgroup scores were significantly lower in RA group (p=0.000). Purdue scores, hand grip strength and pinch strength of the groups are shown in Figure 1. There was not significant difference between RF (+) and RF (-) patients according to grip strength, purdue peg board scores and DHI scores.

MR images were assessed for the presence of synovitis, tenosynovitis, erosion and bone edema. MRI findings are summarized in Table III. Capitate, lunate and scaphoid bones had the highest total scores for bone erosion and bone edema. The most common site for tendon involvement was the extensor carpi ulnaris. In-

TABLE II. DURUOZ HAND INDEX SCORE AND RANGE OF MOTION OF RA GROUP

	RA group n=33	Control group n=33	p
Duruoz Hand Index score	16,5 ± 13,2	0,3 ± 0,5	0.000
Wrist flexion	47.2 ±15.6	72.9 ± 3.7	0.000
extension	43.1 ±17.3	66.9 ± 3.9	0.000
ulnar deviation	29.8 ±10.1	33.3 ± 3.5	0.067
radial deviation	15.1±6.1	20.0 ± 2.5	0.000
2nd phalanx TROM	239.8 ± 21.6	264.8 ± 6.1	0.000
3th phalanx TROM	243.9 ± 21.7	268.9 ± 5.3	0.000
4th phalanx TROM	238.1 ± 23.4	274.4 ± 3.7	0.000
5th phalanx TROM	242.1 ± 21.3	236.9 ± 3.4	0.000
Thumb			
abduction	51.8 ± 6.7	58.3 ± 2.4	0.000
extension	52.8 ± 7.2	59.6 ± 1.7	0.000
1st MCP flexion	49.1 ±9.5	57.2 ± 3.3	0.000
1st IP flexion	64.4 ± 11.1	71.8 ± 3.9	0.000

TROM: Total range of motion

tercarpal and distal radioulnar joints had the highest total scores for synovitis. MR images of two patients are shown in Figure 2 indicating erosion, bone edema, synovitis and tenosynovitis. There was not significant difference between patients according to hand overuse history. Disease duration was positively correlated with bone edema and synovitis scores (p=0.025, p=0.006) but not with bone erosion and tenosynovitis score (p>0.05). Bone edema, bone erosion, tenosynovitis and synovitis total scores were higher in patients with deformity but difference was not statistically significant (p>0.05). There was not significant difference between RF (+) and RF (-) patients according to MRI scores (p>0.05).

When we evaluated hand grip strength and pinch strength, we found negative correlation with tenosynovitis score. Correlation coefficients and p values are shown in Table IV. As the purdue pegboard scores were lower, tenosynovitis scores were significantly higher. Correlation between hand grip and tenosynovitis score is shown in Figure 3. There was a significant positive correlation between DHI scores and tenosyno-

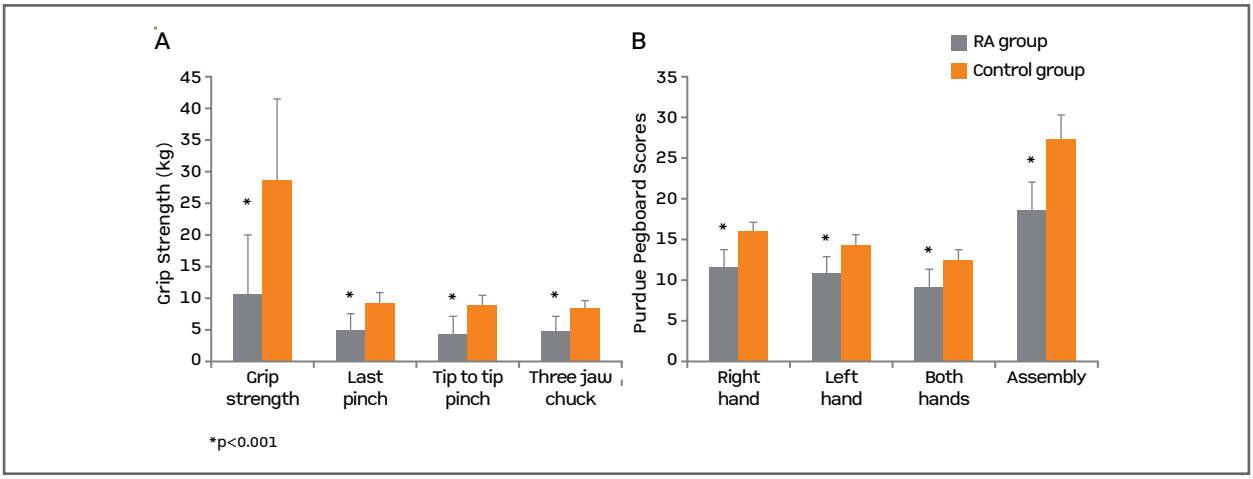

FIGURE 1. Grip-pinch strengths and Purdue pegboard scores of RA and control groups

TABLE III. MEAN GLOBAL SCORES OF WRIST AND MCP JOINTS IN PATIENTS WITH RA

MRI findings and location	Range of possible scores	MRI scores
Bone erosions*	0-30	5.9 (0-19)
Carpal joints	0-20	5.1 (0-18)
MCP joints	0-10	0.9 (0-5)
Bone edema*	0-30	5.2 (0-20)
Carpal joints	0-20	4.6 (0-20)
MCP joints	0-10	0.6 (0-4)
Synovitis ¤	0-10	2.3 (0-7)
Carpal joints	0-8	2.1 (0-6)
MCP joints	0-2	0.2 (0-2)
Tenosynovitis ¤	0-18	3.8 (0-14)
Flexor tendons	0-6	0.8 (0-6)
Extensor tendons	0-12	3.1 (0-11)

Note: *n= 33; ¤ n= 31
Data in parentheses are ranges

vitis score. Wrist ROM was essentialy correlated negatively with bone edema scores. There were no correlation between second to fifth finger ROM and MRI scores. Correlation coefficients and p values are shown in Table IV.

DISCUSSION

Functional outcome in RA is influenced by the extent of structural damage to joints, bones and tendons plus severity of the joint inflammation[18]. The joints of the hand are among the first to be affected in RA and hand function is an important aspect of global function[19]. Pain, decrement in joint ROM, muscle weakness, reduced grip strength and hand deformities may alter hand function and fine hand skills[8]. The resulting hand disability affects the activities of daily living and may cause dependency on others, which is a major problem

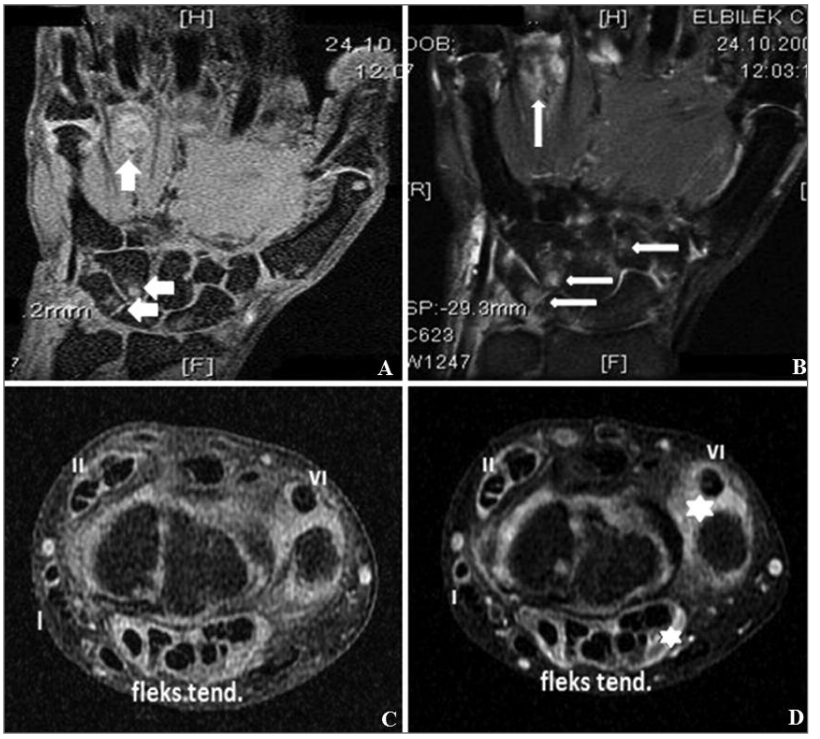

FIGURE 2. MRI scan of the dominant hand in 55-year-old man with confirmed diagnosis of RA. T2 weighted coronal GE fat-suppressed sequence (a) showing erosion, edema and synovitis in all of the carpal bones, distal radius-ulna and distal metacarpal bones (short arrows). MRI scan of the right hand of the same patient. T2 weighted coronal PD fat-suppressed sequence (b) showing erosions, edema and synovitis in all of the carpal bones, distal radius-ulna and distal metacarpal bones (long arrows). T1 weighted transverse pre- (c) and post-contrast (d) MR images (unenhanced and gadolinium-enhanced) of the dominant hand in 61-year-old man with confirmed diagnosis of RA. MR images showing tenosynovitis of extensor pollicis brevis (first compartment), extensor carpi radialis, longus and brevis (second compartment), extensor carpi ulnaris (fourth compartment) and flexor tendons (stars). Note the presence of bone erosion, edema and synovitis in carpal bones.

TABLE IV. CORRELATION BETWEEN HAND EVALUATION PARAMETERS AND MRI FINDINGS

		Erosion score	Bone edema score	Synovitis Score	Tenosynovitis score
Grip strength	r	-0.320	-0.415	-0.447	-0.603
	p	0.070	**0.016**	**0.012**	**0.001**
Lateral pinch	r	-0.204	-0.186	-0.312	-0.563
	p	0.255	0.300	0.088	**0.001**
Tip-to-tip pinch	r	-0.124	-0.208	-0.406	-0.611
	p	0.492	0.245	**0.023**	**0.001**
Three chuck pinch	r	-0.168	-0.217	-0.319	-0.605
	p	0.350	0.226	0.080	**0.001**
Purdue pegboard	r	-0.091	-0.192	-0.200	-0.447
right hand	p	0.637	0.318	0.317	**0.019**
Purdue pegboard	r	-0.146	-0.348	-0.367	-0.441
both hands	p	0.416	**0.047**	**0.042**	**0.013**
Purdue pegboard	r	-0.213	-0.317	-0.352	-0.365
assembly	p	0.234	0.072	**0.050**	**0.043**
Duruoz hand	r	0.020	0.165	0.327	0.522
index score	p	0.912	0.358	0.073	**0.003**
Wrist flexion	r	-0.470	-0.653	-0.443	-0.256
	p	**0.006**	**0.000**	**0.013**	0.165
extension	r	-0.533	-0.493	-0.289	-0.221
	p	**0.001**	**0.004**	0.115	0.232
ulnar deviation	r	-0.132	-0.428	-0.166	-0.122
	p	0.464	**0.013**	0.373	0.514
radial deviation	r	-0.459	-0.624	-0.270	-0.223
	p	**0.007**	**0.000**	0.142	0.228
2nd phalanx TROM	r	-0.250	-0.312	-0.143	-0.107
	p	0.161	0.077	0.444	0.568
3th phalanx TROM	r	-0.103	-0.319	-0.357	-0.186
	p	0.567	0.070	**0.048**	0.317
4th phalanx TROM	r	-0.174	-0.310	-0.373	-0.159
	p	0.334	0.079	**0.039**	0.393
5th phalanx TROM	r	-0.156	-0.270	-0.291	-0.199
	p	0.387	0.128	0.113	0.284

TROM: Total range of motion

in RA[20]. Therefore hand involvement and function should be seriously taken into account in the evaluation of the patients.

In this study, we evaluated rheumatoid hand by defining deformities and investigated the effect of RA on the grip strength, pinch strength, joint ROM, dexterity and functional ability. Hand deformity is an important feature of RA and presence of hand deformities added useful prognostic information, being an early sign of a more severe disease. In this study fifteen patients had at least one deformity (45.5%) and deformity rate was lower when compared to other studies[21,22]. This may be due to patients with advanced stage disease could not be included into the study because of limitations in MR imaging (such as difficulties in positioning in MRI machine due to contractures). We compared hand function of the patients with hand deformity with the patients without deformity. Grip strength, tip to tip pinch strength, three jaw chuck strength, purdue pegboard right hand, purdue pegboard both hand, purdue pegboard assembly and DHI scores were significantly lower in the patients with

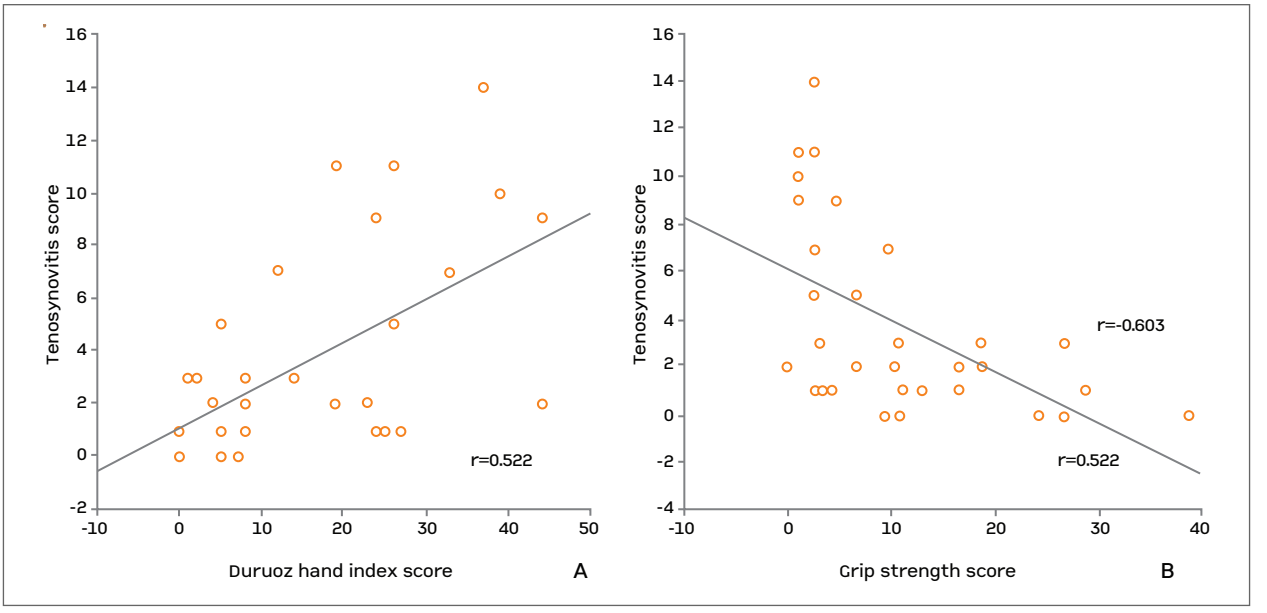

FIGURE 3. Correlation of grip strength and Duruoz hand index scores with tenosynovitis score

hand deformities in comparison to the patients without deformity.

Grip strength and pinch strength are important indices of the functional integrity of the hand. Grip strength and three chuck pinch constitute 14% and 10% of all the daily activities respectively[23]. In this study, we found grip strength and all subgroups of the pinch strength significantly lower in RA group. Similar to our findings, several studies reported that patients with RA had lower grip strength and pinch strength[24,25]. ROM measurement can provide a cost effective assessment of hand function[23]. Limited ROM can lead to impaired hand function and difficulty in daily living activities. Decrease in joint ROM, as disease progress in RA, was reported by several studies[26,27]. Similar to the previous studies, we also found significant decrease in wrist and finger ROM in all directions except for ulnar deviation in RA group.

Conventional measures like ROM and grip strength explain only a part of limitations in performing activities of daily life. So we used the Purdue pegboard test for evaluating hand dexterity and similar to previous study done by Jones et al[28], we found Purdue scores significantly lower in patients with RA. We used DHI to assess functional handicap and functional disability[15]. DHI had better responsiveness than impairment and disease activity measures such as pain, morning stiffness duration, swelling and tenderness[8]. DHI scores of our patients were significantly higher when compared to control group.

As well as clinical parameters, radiological techniques are used in diagnosis and follow up of the patients. Radiographic damage is an important outcome measure in RA, in addition to assessments of physical function and disease activity. Several studies have shown that disease activity is associated with physical disability and radiographic damage[29]. MRI is an imaging method that can reveal erosions as well as synovitis and tenosynovitis early in RA, giving a detailed picture of joint inflammation and damage[10]. Given these advantages, MRI has a major potential as an outcome measure in RA clinical trials and investigations[10,18]. In this study we performed MR imaging on the dominant hand of RA patients. We assessed the relationship of MR imaging findings of RA with the clinical parameters we had been evaluated. Disease duration revealed positive correlation with bone marrow edema and synovitis scores but not with bone erosion and tenosynovitis scores. MRI scores did not differ significantly between RF (+) and RF (-) patients. Though all MRI scores were higher in patients with deformities, the difference was not statistically significant. We found significant correlation between wrist motion and bone edema-erosion scores.

We identified significant correlation between tenosynovitis and grip strength, pinch strength, Purdue

pegboard test scores and DHI scores.A study similar to our work at certain points was reported by Benton et al[30]. They investigated whether MR imaging could be used to predict functional outcome in patients with RA in 6-year follow-up. They found significant correlation between health assessment questionnaire (HAQ), short form 36 (SF-36) and bone erosion score and reported that early MRI evidence of bone marrow edema at the carpus can be a predictor of global function as measured by SF-36. Zheng et al[18] compared Sollerman hand function test with MRI parameters to investigate the role of early MR imaging of the wrist in predicting functional outcome in RA and suggested that MRI bone edema, bone erosion, and to a lesser extent synovitis and tendonitis detected at the wrist in early RA have prognostic significance in terms of hand and specifically tendon function in the medium term[18]. Haavardsholm et al[31] found significant correlation between grip strength and bone edema score. Eshed et al[19] identified flexor tenosynovitis in the hands as a risk factor for destructive erosion of the joints.

As a result, this study showed that RA effects negatively hand function and dexterity and the parameters used in the evaluation of hand function in RA patients were mainly associated with tenosynovitis scores. Tenosynovitis is a common pathology in RA and clearly has a significant impact on hand function[32]. So MRI can be used as a supportive method in early diagnosis of tenosynovitis and may be useful in identification of patients requiring aggressive treatment. Further prospective studies are required to explore these possibilities and clarify the clinical relevance of these parameters with MRI findings.

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