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SURGICAL MEDICAL SCIENCES / CERRAHİ TIP BİLİMLERİ

The Role of Hand Surgery on Quality of Life and Patient Satisfaction in Rheumatologic Patients

Romatolojik Hastalarda El Cerrahisinin Yaşam Kalitesi ve Hasta Memnuniyeti Üzerindeki Rolü

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Abstract

Objectives: Rheumatologic diseases, particularly rheumatoid arthritis (RA), often lead to hand and wrist dysfunction, significantly impairing patients' quality of life. Despite advancements in pharmacotherapy, deformities, pain, and functional losses persist, necessitating surgical interventions. This study evaluates the outcomes of hand surgeries in rheumatologic diseases, focusing on functional improvements, pain relief, and patient satisfaction.

Materials and Methods: A retrospective analysis was conducted on 17 patients with confirmed rheumatologic diagnoses, including RA, systemic lupus erythematosus, scleroderma, and ankylosing spondylitis, who underwent hand surgeries between 2021 and 2024. Functional outcomes were assessed using the sequential occupational dexterity assessment (SODA) and Duruoz Scale, along with grip strength and pain levels measured using a visual analog scale (VAS). Complications, postoperative erythrocyte sedimentation rate (ESR), and patient satisfaction were also evaluated.

Results: Soft tissue surgeries (79.2%) were more prevalent than bone surgeries (20.8%). Significant improvements were observed in functional outcomes (SODA and Duruoz Scores), grip strength, and VAS scores for general and hand-specific pain. However, ESR values remained unchanged, indicating persistent systemic inflammation. Complications occurred in 23.5% of patients, including infections, tendon adhesions, and recurrence of deformities. Patient satisfaction scores were moderate, highlighting unmet expectations.

Conclusion: Hand surgeries provide substantial functional and pain-related benefits for patients with rheumatologic diseases, but moderate satisfaction levels and high complication rates underscore the need for better preoperative counseling, implant accessibility, and multidisciplinary management. Future studies with larger cohorts are warranted to refine surgical approaches and improve outcomes.

Keywords: Rheumatologic diseases, hand surgery, rheumatoid arthritis, patient satisfaction, functional outcomes

Öz

Amaç: Romatolojik hastalıklar, özellikle romatoid artrit (RA), el ve bilek fonksiyon bozukluğuna yol açarak hastaların yaşam kalitesini olumsuz etkilemektedir. Farmakoterapideki ilerlemelere rağmen, deformiteler, ağrı ve fonksiyonel kayıplar devam etmekte olup, cerrahi müdahaleleri gerekli kılmaktadır. Bu çalışma, romatolojik hastalıklarda el cerrahisi işlemlerinin fonksiyonel iyileşme, ağrı hafifletme ve hasta memnuniyeti üzerindeki etkilerini değerlendirmektedir.

Gereç ve Yöntem: 2021-2024 yılları arasında RA, sistemik lupus eritematozus, skleroderma ve ankilozan spondilit tanılarına sahip ve el cerrahisi geçiren 17 hasta üzerinde retrospektif bir analiz yapılmıştır. Fonksiyonel sonuçlar, sıralı işlevsel el yeterliliği değerlendirmesi (SODA) ve Duruöz Ölçeği ile değerlendirilmiş; kavrama gücü ve ağrı seviyeleri görsel analog skala (VAS) ile ölçülmüştür. Komplikasyonlar, ameliyat sonrası eritrosit sedimentasyon hızı (ESR) ve hasta memnuniyeti de değerlendirilmiştir.

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Bulgular: Yumuşak doku cerrahisi işlemleri (%79,2), kemik cerrahisi işlemlerinden (%20,8) daha yaygındı. Fonksiyonel sonuçlar (SODA ve Duruöz skorları), kavrama gücü ve genel ile el bölgesine özgü ağrı VAS skorlarında anlamlı iyileşmeler gözlenmiştir. Ancak, ESR değerlerinde değişiklik olmamış ve bu durum sistemik enflamasyonun devam ettiğini göstermiştir. Hastaların %23,5'inde enfeksiyon, tendon yapışmaları ve deformite nüksü gibi komplikasyonlar görülmüştür. Hasta memnuniyeti puanları ise orta düzeyde olup, karşılanmamış beklentilere işaret etmektedir.

Sonuç: El cerrahisi işlemleri, romatolojik hastalarda fonksiyonel ve ağrıya bağlı önemli faydalar sağlamaktadır; ancak orta düzeyde memnuniyet oranları ve yüksek komplikasyon oranları, daha iyi ameliyat öncesi danışmanlık, implant erişilebilirliği ve multidisipliner yönetim ihtiyacını vurgulamaktadır. Daha geniş hasta gruplarıyla yapılacak gelecekteki çalışmalar, cerrahi yaklaşımların iyileştirilmesine ve sonuçların geliştirilmesine katkı sağlayacaktır.

Anahtar Kelimeler: Romatolojik hastalıklar, el cerrahisi, romatoid artrit, hasta memnuniyeti, fonksiyonel sonuçlar

Introduction

Rheumatologic diseases are chronic conditions that profoundly impact patients' daily lives by causing deformities, pain, and functional loss in the affected joints. Among the most common autoimmune diseases, rheumatoid arthritis (RA) is characterized by polyarticular synovitis accompanied by bone and cartilage destruction (1).

Pain is one of the most frequently reported and primary symptoms in patients with RA (2-4). When individuals living with RA are asked to identify their most significant symptom, pain is often ranked as the highest priority (2). This underscores the importance of surgical interventions as both diagnostic and therapeutic options. However, the optimal surgical procedures for specific diagnoses, their complication risks, and their impact on patients' functional outcomes and quality of life remain unclear.

In RA patients, the metacarpophalangeal, proximal interphalangeal, and wrist joints are more frequently involved than other joints in the body (5). Up to 70% of patients experience dysfunction in the hand and wrist (6), with the hand being the most commonly affected site in RA. Over the past two decades, significant advancements have been made in the pharmacotherapy of RA. However, many patients continue to experience issues in their hands. Joint damage, tenosynovitis, and tendon ruptures are common and lead to deformities that impair grip and pinch strength. Not all these deformities are suitable for surgical intervention, as patients often adapt to the gradual loss of function despite the deformity (7).

Highly motivated patients concerned about the appearance of their hands often aim to achieve improved daily activity levels and quality of life (8). With the use of methotrexate, biologic disease-modifying antirheumatic drugs (bDMARDs), or emerging targeted synthetic DMARDs (tsDMARDs), previously uncontrolled synovitis has been alleviated, and more than 50% of patients are in remission (3). However, in recent years, "painless" overuse has increased the risk of deformity, osteoarthritis, tendon rupture, and entrapment neuropathy (9).

In contemporary rheumatologic hand surgery, while the use of DMARDs has largely prevented the progression of severe deformities, difficulties in accessing arthroplasty implants have shifted focus toward palliative surgical approaches. Moreover, poor communication between rheumatologists and surgeons has weakened multidisciplinary treatment approaches, reducing referral rates of these patients to surgical units (10,11).

This study aims to explore the fundamental dynamics of hand surgery in rheumatologic diseases, evaluating commonly performed surgical techniques along with their success rates and complications. Particular attention will be given to patient-centered outcomes, including postoperative functional levels, changes in quality of life, and satisfaction with treatment. The primary goal is to assess the benefits and risks of surgical procedures targeting affected joints. The secondary objective is to evaluate the impact of surgery on quality of life and patients' individual satisfaction levels. The findings will provide valuable insights for improving current standards of practice in rheumatologic hand surgery.

Materials and Methods

Study Design and Patient Selection

This retrospective study was conducted to evaluate hand surgery practices in patients with rheumatologic conditions. A total of 17 patients who underwent hand surgery at our clinic between 2021 and 2024 were included. Inclusion criteria were a diagnosis of RA, systemic lupus erythematosus (SLE), scleroderma, or ankylosing spondylitis (AS) confirmed by rheumatologists, receipt of surgical treatment, and a minimum of 6 months of postoperative follow-up. Only primary surgical procedures were included, and revision surgeries were excluded. Furthermore, surgeries were performed on patients where the primary goal of the intervention was to achieve functional improvement and pain relief. Demographic and clinical data such as gender, age, diagnosis, disease duration, drug use (DMARDs), and education level were recorded.

Informed consent was obtained from all patients in accordance with the 1975 Declaration of Helsinki. The research

protocol was approved by the Human Research Ethics Committee of the University of Ankara (decision number: İ11-899-24, date: 13.01.2025).

Data Collection and Evaluation Process

Patient data were retrospectively obtained from medical records, operative notes, and follow-up outpatient clinic records. The parameters reviewed included

1. Demographic and clinical data: Age, gender, diagnosis type, disease duration, DMARD usage, and education level.

2. Surgical data: Total number of surgeries, types of surgeries (classified as bone surgeries or soft tissue surgeries), and the number of affected joints.

3. Functional and Pain Assessments

Sequential Occupational Dexterity Assessment

Used to evaluate hand dexterity. This included both observed tests and patient-reported questions. Observed hand dexterity was assessed using sequential occupational dexterity assessment (SODA), which measures bimanual functional abilities during daily living activities. The test comprises 12 standardized tasks performed under controlled conditions, scored by a specialist, with higher scores indicating greater hand dexterity. The structure, validity, and content of this test have been previously described (4).

Duruoz Scale

This self-reported scale consists of 18 questions designed to evaluate hand disability. The questions are divided into five categories: kitchen tasks, dressing, personal hygiene, work, and other activities. Responses were scored as follows: no difficulty (=0), very little difficulty (=1), some difficulty (=2), much difficulty (=3), almost impossible (=4), and completely impossible (=5). The total score ranged from 0 to 90, with higher scores indicating greater impairment (12).

Grip Strength

In addition to the two hand dexterity measures, precise grip strength in kilograms was measured using a Baseline hydraulic hand dynamometer (New York, USA). Grip strength was measured three times for each hand, and the average score for each hand was used.

Visual Analog Scale

This was employed for both general pain and hand-specific pain assessment. General pain was measured using a visual analog scale (VAS), while hand pain was evaluated using a separate VAS.

1. Laboratory Data

Erythrocyte sedimentation rate (ESR) was recorded in the preoperative and postoperative periods.

2. Patient Satisfaction

Patients completed a brief questionnaire to evaluate their satisfaction with the overall effects of the surgical intervention. This questionnaire included six items rated on a 4-point scale (strongly disagree, disagree, agree, strongly agree). Items are listed in Table 1. Negatively phrased items (3 and 5) were reverse scored. A total score (range: 6-24) was calculated by summing the six items (4).

Surgical Techniques

All surgeries were performed by expert hand surgeons and orthopedic surgeons following standard sterilization and anesthesia protocols. Soft tissue surgeries included synovectomy, ligament reconstruction, tenodesis and tendon transfers, capsuloplasty/interposition, calcinosis excision, ulnar nerve decompression and anterior transposition, and flap-based skin closure. Bone surgeries included arthrodesis and bone resections.

Follow-Up Process and Complication Assessment

Patients were followed postoperatively for an average of 10.29 months. All patients were assessed at baseline and during their latest postoperative outpatient visit. Complications, including infections (superficial or deep), adhesions following tendon transfers, and recurrence of deformities, were evaluated. All complications were recorded within the first three months postoperatively, and appropriate treatment approaches were determined.

Statistical Analysis

In this study, statistical analyses were performed using Jamovi version 2.3.2. The normality of data distribution was evaluated using the Shapiro-Wilk test. Descriptive statistics for numerical data are reported as mean ± standard deviation and range (minimum-maximum values). Categorical data are presented as

Table 1: Patient satisfaction scale

	Strongly disagree	Disagree	Agree	Strongly agree
I am satisfied with the results of the surgery	1	2	3	4
My hand improved because of the surgical procedure	1	2	3	4
The results of the surgery are disappointing	4	3	2	1
The surgery was a success	1	2	3	4
The surgery has been to no avail	4	3	2	1
I would undergo the same procedure again	1	2	3	4

percentages. The Wilcoxon test and Student's t-test were used to compare repeated measures on the same subjects. Statistical significance was determined at a 95% confidence interval, with $p<0.005$ considered statistically significant.

Results

The mean age of the 17 patients included in the study was 51.47 years, and 82.3% of the patients were female. Regarding diagnoses, RA was the most common, accounting for 10 patients (58.8%). Scleroderma and SLE diagnoses were observed equally (17.6% each), while AS was less frequent (5.8%). The average disease duration of 12.17 years indicated that patients had undergone chronic and long-term treatment processes. Additionally, 76.4% of patients used DMARDs, highlighting the widespread use of pharmacological treatment in this group. The demographic and clinical data are presented in Table 2.

Soft tissue surgeries (79.2%) were more common than bone surgeries (20.8%) among the 22 joint procedures performed. The conditions, procedures performed, and number of procedures are summarized in Tables 3 and 4.

Postoperative follow-up lasted an average of 10.29 months, during which significant improvements were observed in functional and pain assessment parameters. SODA, Duruoz Scale, grip strength, and VAS scores for general and hand-specific pain showed significant postoperative improvements. However, unchanged ESR values after three months suggested that inflammatory activity was independent of surgical intervention (Table 5).

The patient satisfaction survey yielded a mean score of 14.58 out of 24, indicating a moderate level of satisfaction. This finding underscores the need for better management of patient expectations.

Postoperative complications occurred in 4 patients (23.5%), including superficial and deep infections, adhesions in tendon transfers, and recurrence of deformities. These findings highlight the need for careful management of postoperative risks in rheumatologic patients.

Surgical interventions improved functional outcomes and pain levels in patients, but factors such as complications and satisfaction levels necessitate more comprehensive evaluation and refinement of treatment approaches.

Table 2: The demographic and clinical data

Age (years)	51.47±7.88 (37-66)
Gender	
Male	3 (17.6%)
Female	14 (82.4%)
Disease	
Rheumatoid arthritis	10 (58.8%)
Scleroderma	3 (17.6%)
Systemic lupus erythematosus	3 (17.6%)
Ankylosing spondylitis	1 (5.8%)
Involved joints	
Proximal interphalangeal joint	7 (31.8%)
Metacarpophalangeal joint	7 (31.8%)
Wrist joint	6 (27.2%)
Elbow joint	2 (9.1%)
Follow-up duration (months)	10.29±5.93 (6-28)
Disease duration (years)	12.17±6.26 (2-22)
DMARD therapy	
Yes	13 (76.5)
No	4 (23.5%)
Education level	
Primary education	3 (17.6%)
High school	10 (58.8%)
University	4 (23.5%)
Satisfaction	14.58±3.16 (9-20)

DMARD: Disease-modifying antirheumatic drug

Discussion

This study aimed to evaluate the effects of hand surgery in rheumatological diseases based on patient-centered outcomes, analyzing its impact on functional results, pain levels, quality of life, and patient satisfaction. The findings highlight both the benefits of hand surgery in rheumatological conditions and the challenges encountered during the process.

Table 3: The conditions, procedures performed, and number of procedures

Condition	Procedure performed	Number of procedures
Boutonniere deformity	Arthrodesis	4
Boutonniere deformity	Thompson procedure	1
Swan neck deformity	Tenodesis	2
Cubital tunnel syndrome	Anterior transposition	2
Calcinosis	Excision	2
Tendon rupture	Tendon transfer	4
Metacarpophalangeal joint involvement	Interpositional arthroplasty	1
Metacarpophalangeal joint involvement	Ligament reconstruction	1
Metacarpophalangeal joint involvement	Crossed intrinsic transfer	4
Metacarpophalangeal joint involvement	Foucher flap	1
Distal radioulnar joint involvement	Darrach procedure	1
Wrist joint involvement	Synovectomy ± ligament reconstruction	2

In this study, soft tissue surgeries were found to be more common than bone surgeries (79.2%). This suggests that, in a patient group where deformities are largely prevented, the primary goal of surgery is usually palliative treatment. The widespread use of DMARD therapy and biological agents has controlled active inflammatory processes such as synovitis, but it has also created a new patient profile characterized by "pain-free deformity" Although adequate pain relief was achieved, inflammation seems to persist, which can lead to significant destruction. This process could be referred to as "silent destruction" (13). A study examining the outcomes of painful and pain-free synovitis found that in long-standing female RA

Table 4: The surgical procedures

Patient number	Age	Gender	Rheumatologic disease	Affected joint	Surgical procedure
1	66	M	Rheumatoid arthritis	Bilateral hip and 5th finger PIP joint (boutonniere)	5th PIP arthrodesis
2	54	W	Rheumatoid arthritis	2nd finger PIP joint boutonniere	Boutonniere deformity reconstruction using PL tendon graft
3	61	W	Rheumatoid arthritis	Wrist	SL reconstruction + synovectomy + joint debridement
4	47	M	Ankylosing spondylitis	Bilateral column, bilateral sacroiliac joint and elbow	Anterior transposition of the ulnar nerve + synovectomy
5	37	W	Systemic lupus erythematosus	2nd, 3rd, 4th, 5th Fingers PIP joint (2nd, 3rd swan-neck 4th, 5th Boutonniere)	2nd -3rd Ulnar lateral band tenodesis + 4th -5th PIP Arthrodesis + synovectomy + joint debridement
6	57	W	Systemic lupus erythematosus	Bilateral elbow	Anterior transposition of the ulnar nerve + synovectomy
7	63	W	Rheumatoid arthritis	Bilateral knee and right wrist	Tendon transfer EIP to 4th EDC + tenosynovectomy
8	56	W	Rheumatoid arthritis	5th MP Joint	5th MP joint collateral ligament reconstruction with PL tendon graft + synovectomy + joint debridement
9	55	W	Rheumatoid arthritis	Wrist	Darrach procedure + joint debridement + synovectomy + EIP transfer to 3rd-4th-5th EDC
10	53	W	Scleroderma	3rd PIP joint (skin defect)	3rd PIP arthrodesis
11	41	W	Rheumatoid arthritis	Wrist	EPL rupture-EIP transfer + synovectomy
12	49	W	Rheumatoid arthritis	2nd MP joint	2. Mp joint dorsal capsule interposition arthroplasty + joint debridement
13	51	W	Scleroderma	Bilateral knee and elbow	Elbow subcutaneous calcinosis excision
14	43	W	Rheumatoid arthritis	2nd, 3rd, 4th, 5th Mp joint (ulnar drift hand)	Crossed intrinsic transfer + synovectomy + joint debridement
15	44	M	Scleroderma	2nd MP joint (skin defect)	Foucher flap
16	50	W	Systemic lupus erythematosus	Elbow	Elbow synovectomy + calcinosis excision
17	48	W	Rheumatoid arthritis	Wrist	Arthroscopic synovectomy

PIP: Proximal interphalangeal, PL: Palmaris, SL: Scapholunate, EPL: Extensor pollicis longus, M: Men, W: Women, EDC: Extensor digitorum communis

Table 5: The preoperative and postoperative evaluation of SODA, Duruoz Scale, grip strength, and VAS scores for general and hand-specific pain

	Pre-operative	Postoperative	p-value
ESR	32.11±6.67 (22-47)	33.47±12.5 (20-63)	0.705
SODA	6.52±2.85 (2-11)	9.76±2.07 (5-12)	0.000
Duruoz Score	43.64±13.52 (23-66)	28.23±13.66 (11-50)	0.000
Grip strength (kg)	12.11±2.47 (9-17)	14.17±3.5 (8-20)	0.001
Over all VAS	6.23±1.34 (4-8)	4.35±1.32 (1-6)	0.001
Hand-specific VAS	5.52±1.54 (3-8)	3.88±1.16 (2-5)	0.003

ESR: Erythrocyte sedimentation rate, SODA: Sequential occupational dexterity assessment, VAS: Visual analog scale

patients, bone erosion, ultrasound inflammatory measurements, radiographic findings, clinical deterioration, and treatment changes progressed similarly in the pain-free group within one year (14). This situation necessitates a reevaluation of surgical indications.

Regarding functional outcomes, significant improvements in both the SODA and Duruoz Scales indicate that surgery contributes to patients' daily living activities. However, the moderate level of patient satisfaction (mean score: 14.58/24) suggests that expectations from surgery were not fully met. The literature has often reported that patient satisfaction is more closely related to cosmetic outcomes rather than functional results (15). Measuring or uncovering patient expectations is an important first step in managing outcomes. The common-sense model suggests that patients' expectations are likely to evolve over time as they acquire new information and gain experiences related to their condition (16). This may cause surgical outcomes to fall short of expectations, especially in patients with high concerns about appearance. Therefore, managing patient expectations accurately before surgery is crucial.

With 20 years of experience in hand surgery, Herren ranked three interventions as clear "winners" for RA treatment based on his scoring system: ulna head resection, dorsal ten synovectomy, and 1st metacarpophalangeal joint arthrodesis (13). In our study, highly successful surgeries included proximal interphalangeal arthrodesis for boutonniere deformity (Figure 1), tendon transfer for tendon rupture (Figure 2), and dorsal wrist synovectomies (Figure 3).

Since the introduction of new medications, the types of surgical procedures have also changed. Procedures that were once common, such as wrist arthrodesis and metacarpophalangeal arthroplasties, are now rarely performed, while wrist arthroplasties and proximal interphalangeal replacements are being done more frequently (13). Limitations in implant usage in our country, especially in bone surgeries, pose a significant obstacle. Challenges in obtaining arthroplasty implants have left patients without surgeries that could provide substantial functional recovery. The prominence of palliative surgeries, instead, may indirectly affect patient satisfaction levels. The lack of implants makes it difficult to fully correct

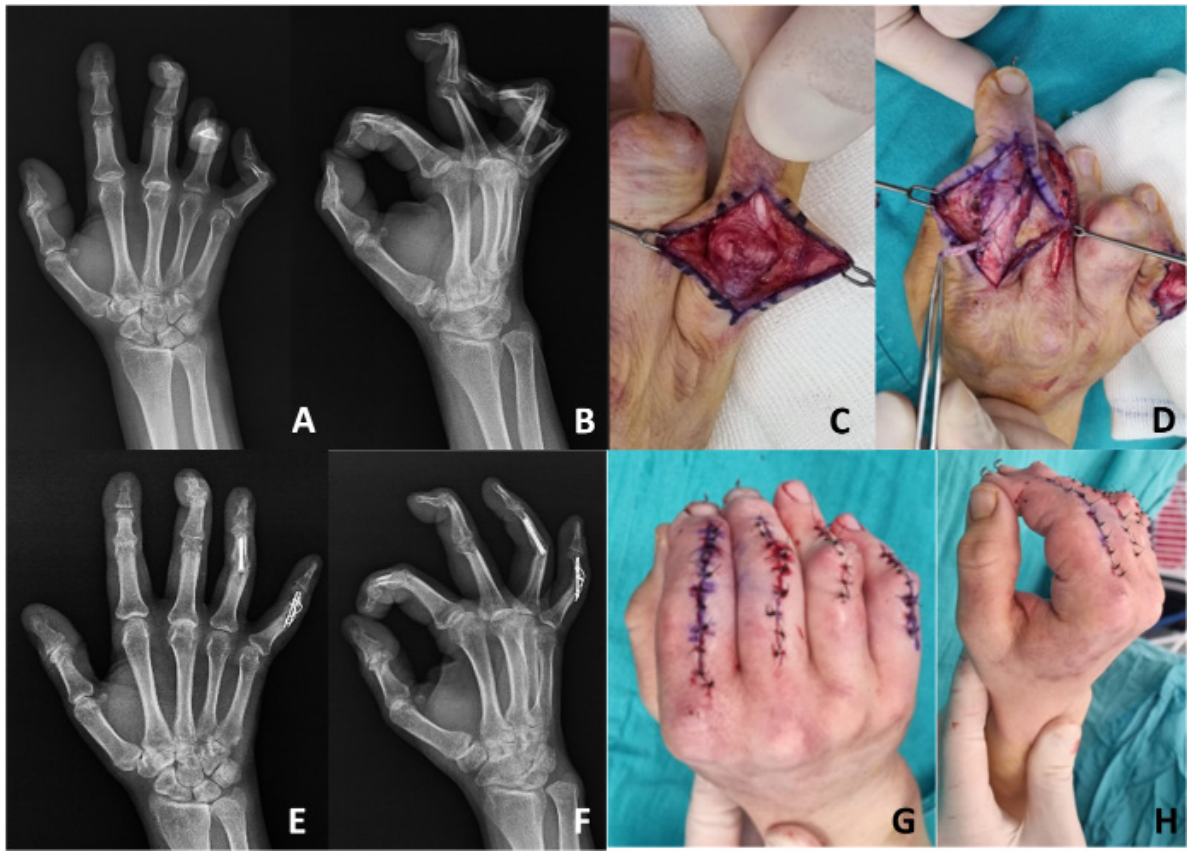

Figure 1: Preoperative findings showed swan-neck deformity in the 2nd and 3rd fingers and boutonnière deformity in the 4th and 5th fingers of the right hand. Surgical correction was achieved using lateral band tenodesis (Littler procedure) for the 2nd and 3rd fingers and PIP joint arthrodesis for the 4th and 5th fingers. Preoperative anteroposterior and oblique radiographs (A-B) illustrate the deformities, while intraoperative images (C-D) display the tenodesis technique. Postoperative radiographs (E-F) confirm the structural corrections, and clinical photographs (G-H) demonstrate the resolution of the deformities, with restored alignment and functionality

PIP: Proximal interphalangeal

deformities and limits long-term functional gains. In cases where degenerative processes, such as RA, progress rapidly, the use of appropriate implants could improve the positive effects on patients' quality of life.

The complication rate of 23.5% underscores the potential risks of surgery in rheumatological diseases. The particularly high infection rates indicate the association of rheumatological diseases with immunosuppressive treatments. In this study, patients with wound infections were receiving non-biological DMARDs, which had been discontinued one to two weeks before surgery. In this context, preoperative (such as DMARD discontinuation) and postoperative approaches for infection control should be implemented more rigorously (17). Additionally, adhesions and recurrence of deformities in tendon transfers highlight the importance of postoperative rehabilitation.

Another noteworthy finding in the study was the lack of significant changes in ESR values post-surgery. This suggests that, despite the local effects of the surgery, there is no direct impact on systemic inflammatory activity. This finding indicates that surgical treatment cannot replace drug therapies such as DMARDs, but rather plays a complementary role.

The predominance of female patients in the study group (82.3%) corresponds with the higher prevalence of rheumatological diseases in women (18). Additionally, the low

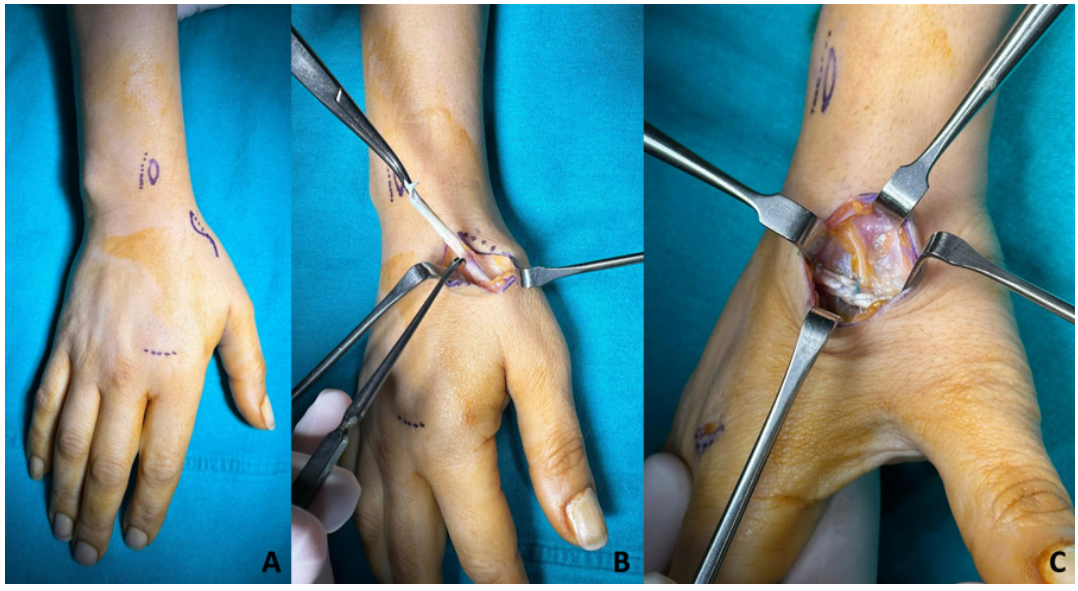

Figure 2: Tendon transfer following chronic EPL rupture. (A) Surgical incision planning. (B) Visualization of the ruptured EPL tendon. (C) Tendon reconstruction performed using the Pulvertaft weave technique
EPL: Extensor pollicis longus

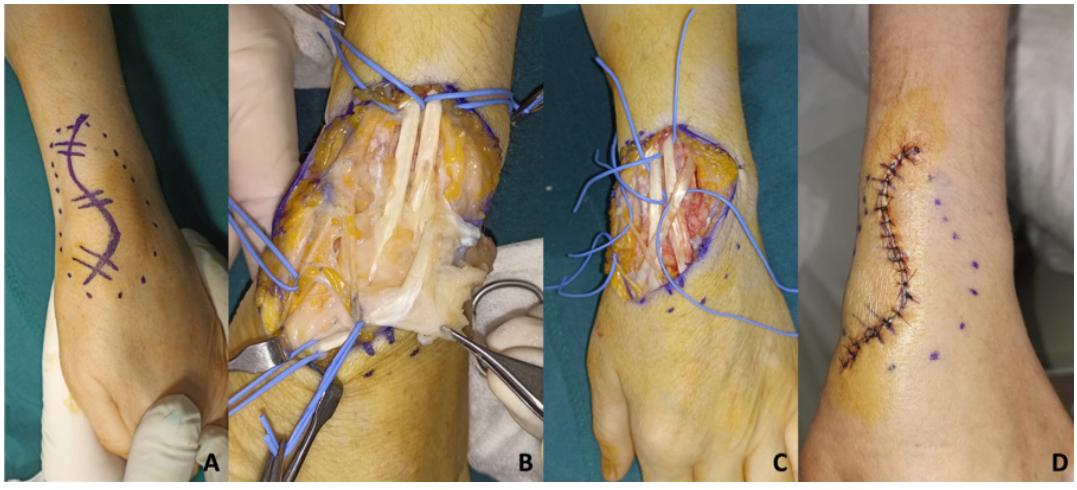

Figure 3: Dorsal wrist synovectomy. (A) Planning of the surgical incision. (B) Dense synovial tissue surrounding the extensor tendons. (C) Appearance after synovectomy. (D) Suturing of the incision line

education level (76.4% without university education) draws attention to the role of health literacy in treatment processes. A cohort study on RA in Egypt found that more highly educated patients had lower disease activity and better functional outcomes, with university education predicting lower disease activity among Egyptian RA patients (19). However, increasing patient education programs and multidisciplinary approaches could contribute to more effective evaluation of surgical outcomes.

Study Limitations

The strengths of this study include the multidisciplinary evaluation of hand surgery in rheumatological diseases and a detailed analysis of patient satisfaction and functional outcomes. However, the study has limitations, including a small sample size (n=17) and a retrospective design.

Conclusion

The findings suggest that surgery is beneficial in terms of functional and pain-related outcomes, but aspects such as patient satisfaction and complications need to be improved. Increasing access to implants, strengthening multidisciplinary approaches, and managing patient expectations are essential measures to enhance the standards of hand surgery in rheumatological diseases. Prospective studies with larger patient groups will deepen the knowledge in this field and offer more comprehensive solutions.

Ethics

Ethics Committee Approval: The research protocol was approved by the Human Research Ethics Committee of the Ankara University (decision number: İ11-899-24, date: 13.01.2025).

Informed Consent: Informed consent was obtained from all patients in accordance with the 1975 Declaration of Helsinki.

Footnotes

Authorship Contributions: Surgical and Medical Practices: U.B., Concept: U.B., Design: U.B., Data Collection and/or Processing: U.B., Analysis and/or Interpretation: M.Y., Literature Search: M.Y., Writing: M.Y.

Conflict of Interest: The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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