

Effectiveness of Rheumatoid Hand Surgery: Contrasting Perceptions of Hand Surgeons and Rheumatologists

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Purpose: Surgical management of rheumatoid hand diseases is controversial with large variation in practice pattern in the U.S. The purpose of this study is to evaluate the attitudes of hand surgeons and rheumatologists toward the effectiveness of rheumatoid hand surgery.

Methods: We designed a survey instrument to examine physicians' opinions about the effectiveness of different surgical treatments for rheumatoid hand deformities. The self-administered survey was mailed to a national random sample of 500 members of the American Society for Surgery of the Hand and 500 members of the American College of Rheumatology.

Results: Of survey responders, 82.5% of hand surgeons versus 34.1% of rheumatologists believe metacarpophalangeal joint arthroplasty improves hand function; 93.2% and 54.6%, respectively, believe prophylactic extensor tenosynovectomy prevents tendon rupture; and 52.5% and 12.6%, respectively, believe small joint synovectomy delays joint destruction.

Conclusions: Rheumatologists view rheumatoid hand surgery as significantly less effective than do hand surgeons, which highlights the disagreements between the 2 specialties about the management of this clinical problem. (J Hand Surg 2003;28A:3-11. Copyright © 2003 by the American Society for Surgery of the Hand.)

Key words: Physician survey, rheumatoid arthritis, variations in care, hand surgery, rheumatology.

Rheumatoid arthritis (RA) is a highly prevalent, devastating disease affecting 1% of the United States population.¹ It is a chronic disease that contributes to lost work and wages, is associated with a lower quality of

life, and confers increased morbidity and mortality.²⁻⁴ Nearly one third of patients are unable to work after 5 years of the disease, and one half are work impaired after 10 years.⁵ Many will experience some form of hand deformity, ranging from chronic pain to impaired activities of daily living owing to joint destruction, dislocation, and soft tissue deformities.⁶⁻⁸ Although advances have been made in total joint replacements and the correction of soft tissue deformities for RA hands, the effectiveness of hand surgery in this patient population seems controversial.

The role of early intervention procedures such as tenosynovectomy and synovectomy for the prevention and delay of arthritic deformities has been debated for years.⁹⁻¹³ The effectiveness of end-stage reconstructive procedures has also been contested, and there are concerns about the long-term functional outcomes of metacarpophalangeal (MCP) joint arthroplasty procedures.¹⁴ In addition the available evidence on surgical outcomes for RA hand deformities is not optimal,

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often involving single-center, uncontrolled case series with limited generalizability.^{12,14}

Our personal interviews with local experts in both the fields of hand surgery and rheumatology reflect this debate about whether or not surgery works. Hand surgeons believe their surgeries improve hand function and decrease pain, and they complain that their rheumatology colleagues underrefer or refer patients too late in the disease process. Many rheumatologists, however, do not believe that surgery for RA hand deformities is effective. To address the issue of physicians' attitudes toward RA hand surgery, we initially looked at regional surgical practice patterns for RA hand disease. Variations in practice patterns can signify diverging treatment strategies among physicians.¹⁵ In the RA population we found significant variations across the country in the rates of arthroplasty, arthrodesis, and tenosynovectomy procedures for hand deformities, with rates from state to state varying by 9- to 12-fold.¹⁶ These national variations may signify differences in physicians' conceptualizations of disease management for the RA population.

Our specific aim in the present study was to quantify on a national level the degree of divergence in the attitudes of specialists toward RA hand surgery. Specifically we evaluated physicians' attitudes toward the effectiveness of common procedures such as MCP joint arthroplasty, extensor tenosynovectomy, small joint synovectomy, and distal ulna resection in RA patients. We also explored whether attitudes regarding the effectiveness of surgery for RA hand disease are associated with physicians' age and, for rheumatologists, their exposure to hand surgery.

Methods

Study Population

A self-administered, cross-sectional survey was mailed to hand surgeons and rheumatologists between October and December of 2001. The study population consisted of a sample of 500 members of the American Society for Surgery of the Hand and 500 members of the American College of Rheumatology who were limited to active physician members (excluding trainees) of each professional organization that lived in the continental United States. The sample was randomly generated from a computer model by using the 2001 membership registry of both organizations and was not based on zip code, age, or duration of professional membership.

Survey Design

Before designing the survey we performed a comprehensive literature review on surgical procedures for RA hand deformities using the Medsearch database. Discrepancies in outcomes data or areas of physician discontent were discussed with hand surgeons and rheumatologists in both the university and community setting through in-depth personal interviews. Information from the interviews and the literature search were incorporated into the survey. Pilot testing of the survey was then performed by administering the survey to a sample of local physicians in both specialties to ensure content validity. Institutional Review Board approval was obtained from the University of Michigan to administer the survey to a national sample of physicians.

The physicians received mailings of the questionnaire in 2 waves to increase the response rate. The first mailing was accompanied by a \$2.00 writing pen as a small gift of appreciation, and receipt of a completed survey made the responder eligible for a Palm Pilot raffle. Incentive gifts are standard techniques in survey research to improve response rates, especially with physician surveys, which generally have low response rates.^{17,18} The survey took approximately 10 minutes to finish, which corresponds to the recommended survey length,¹⁹ and it focused on the treatment effectiveness of different types of surgical procedures for rheumatoid hand disease (Appendix A; this appendix can be viewed at the Journal's Web site, www.jhand-surg.org).

Data Analysis

Physicians were asked to answer questions with responses organized on a 5-point Likert scale (1 = always, 2 = usually, 3 = occasionally, 4 = rarely, 5 = never). Likert scales are a standard format for survey responses.²⁰ To assess the internal reliability of the survey questions, for questions expected to be correlated, we calculated Cronbach's α , a statistical measure of internal reliability in which a value of .6 or greater is considered reliable.²¹ We found high internal reliability of the survey questions regarding attitudes toward MCP joint arthroplasty (Cronbach's α ranging from .78-.87) and distal ulna resection (Cronbach's α ranging from .72-.74).

To compare the demographic characteristics of the 2 specialty groups we used *t*-tests for continuous variables such as age and chi-square tests for categorical variables such as the respondent's gender. For the

Table 1. Attitudes of Hand Surgeons and Rheumatologists Toward the Availability of Surgical Outcomes Research for RA Hand Deformities

	Responded Always/Usually		p Value*	OR†
	Hand Surgeons (n = 280)	Rheumatologists (n = 235)		
High-quality information regarding surgical options and outcomes for rheumatoid hands is available	54.4	19.0	<.001	5.1

*Wilcoxon rank sum test based on 5-point Likert scale (Always/Usually/Occasionally/Rarely/Never).
†OR of having a positive attitude (responding always or usually) for hand surgeons relative to rheumatologists.

purpose of data analysis the Likert scale responses of surgeons and rheumatologists were analyzed by using the Wilcoxon rank sum test. For clarity in data presentation, Tables 2 through 6 display the data in a dichotomized form, showing the positive (always or usually) versus the nonpositive attitudes (occasionally, rarely, or never) toward the effectiveness of the surgical procedure in question. To adjust for the potential effect of other differences between specialties on positive attitudes logistic regression analysis was done with positive attitude (yes vs no) as the dependent variable, and with the rheumatologist group indicator, age, and gender as independent variables.

As a way to assess nonresponse bias respondents from the first mailing were compared with those from the second mailing. If significant differences existed in the characteristics between the first and second responders we would be concerned that nonresponding physicians were different from those that did complete the survey, which is known as a nonresponse bias that can invalidate results.²² We found no statistical difference in the general char-

acteristics of either hand surgeons or rheumatologists from the first and second mailing (Appendix B; this appendix can be viewed at the Journal's Web site, www.jhandsurg.org), which decreases the likelihood of a nonresponse bias.²² All analyses were performed with STATA version 6.0 (College Station, TX) statistical software package, and statistical significance was set at .05 (2-tailed).

Results

Of the 1,000 potential subjects surveyed 30 were considered ineligible (9 wrong addresses, 11 without clinical experience, 1 deceased, and 9 retired). In all, 515 (53.1%) of the eligible subjects returned completed questionnaires, which is an adequate response rate.²³ Respondents' demographic characteristics are shown in Table 6. Men predominated in both specialties, with a significantly higher proportion of men in hand surgery compared with rheumatology ($p = .01$). No significant differences were found in the gender of responders and nonresponders in either specialty. The majority of surgeons and rheumatologists had minimal

Table 2. Hand Surgeons' and Rheumatologists' Attitudes Toward the Effectiveness of Metacarpophalangeal Joint Arthroplasty on the Rheumatoid Hand

	% Responded Always/Usually		p Value*	OR†
	Hand Surgeons (n = 280)	Rheumatologists (n = 235)		
Metacarpophalangeal joint arthroplasty				
Improves hand function	82.5	34.1	<.001	10.1
Decreases pain	91.8	59.2	<.001	8.1
Improves hand aesthetics	95.0	66.5	<.001	11.8
Improves hand strength	33.1	23.6	<.001	1.6

*Wilcoxon rank sum test based on 5-point Likert scale (Always/Usually/Occasionally/Rarely/Never).

†OR of having a positive attitude (responding always or usually) for hand surgeons relative to rheumatologists.

Table 3. Hand Surgeons' and Rheumatologists' Attitudes Toward the Effectiveness of Small Joint Synovectomy and Extensor Tenosynovectomy on the Rheumatoid Hand

	% Responded Always/Usually		p Value*	OR†
	Hand Surgeons (n = 280)	Rheumatologists (n = 235)		
Small joint synovectomy‡				
Delays joint destruction	52.5	12.6	<.001	8.1
Decreases pain	63.9	26.1	<.001	5.4
Extensor tenosynovectomy				
Prevents tendon rupture	93.2	54.6	<.001	13.2
Prevents recurrence of synovitis	57.9	14.2	<.001	11.3

*Wilcoxon rank sum test based on 5-point Likert scale (Always/Usually/Occasionally/Rarely/Never).
†OR of having a positive attitude (responding always or usually) for hand surgeons relative to rheumatologists.
‡Proximal or metacarpophalangeal joint synovectomy.

clinical exposure to the other specialty in training (although significantly more surgeons were exposed to rheumatology than vice versa, 33.1% vs 20.5%, respectively; $p < .01$), and both groups currently have minimal clinical exposure to each other because only 9.6% and 12.4%, respectively, participate in combined hand clinics. In addition 21.7% of surgeons and 18.8% of rheumatologists do not have an active referral exchange with the other specialty.

Tables 2 through 6 display the summary data (Appendix C provides complete data; this appendix can be viewed at the Journal's Web site, www.jhandsurg.org). Physicians were asked if quality information exists regarding the surgical options and outcomes for rheumatoid hand deformities (Table 2). Although significantly more hand surgeons than rheumatologists believe that high-quality information exists (54.4% vs 19.0%, respectively; $p < .001$), a large proportion of physicians find the information deficient.

Physicians' attitudes toward the effectiveness of different surgical procedures are displayed in Tables 3 through 6. In all cases hand surgeons rated surgery as markedly more effective than rheumatologists.

Metacarpophalangeal Joint Arthroplasty

Attitudes toward MCP joint arthroplasty sharply contrast the differences in opinion between the 2 specialty groups (Table 3). Comparing surgeons with rheumatologists regarding the effectiveness of MCP joint arthroplasty, 82.5% versus 34.1% believe it improves hand function ($p < .0001$); 91.8% versus 59.2% believe it improves pain ($p < .0001$); 95% versus 66.5% believe it improves hand aesthetics ($p < .0001$); and 33.1% versus 23.6% believe it improves hand strength ($p < .001$), respectively. The greatest difference in perceived effectiveness of MCP joint arthroplasty between specialists involved hand function and hand aesthetics, as surgeons were 10.1 and

Table 4. Hand Surgeons' and Rheumatologists' Attitudes Toward the Effectiveness of Resection of the Distal Ulna in Rheumatoid Patients

	% Responded Always/Usually		p Value*	OR†
	Hand Surgeons (n = 280)	Rheumatologists (n = 235)		
Resection of the distal ulna				
Improves wrist function	64.6	22.8	<.001	5.3
Decreases wrist pain	80.4	51.1	<.001	3.7
Prevents tendon ruptures	79.9	61.4	<.001	3.0
Improves wrist strength	23.6	18.1	.039	1.3
Improves wrist supination/pronation	72.0	23.4	<.001	9.0

*Wilcoxon rank sum test based on 5-point Likert scale (Always/Usually/Occasionally/Rarely/Never).
†OR of having a positive attitude (responding always or usually) for hand surgeons relative to rheumatologists.

Table 5. Hand Surgeons' and Rheumatologists' Attitudes Toward the Effectiveness of Wrist Fusion and Soft Tissue Reconstruction for Rheumatoid Deformities

	% Responded Always/Usually		p Value*	OR†
	Hand Surgeons (n = 280)	Rheumatologists (n = 235)		
Wrist fusion				
Decreases pain	99.6	91.9	<.001	21.0
Improves hand function	87.9	41.9	<.001	11.0
Boutonniere/swan-neck deformity reconstruction				
Improves hand function	66.4	24.7	<.001	6.9
Improves hand aesthetics	76.2	63.3	<.001	1.9

*Wilcoxon rank sum test based on 5-point Likert scale (Always/Usually/Occasionally/Rarely/Never).

†OR of having a positive attitude (responding always or usually) for hand surgeons relative to rheumatologists.

11.8 times as likely to respond favorably compared with rheumatologists.

Small Joint Synovectomy and Extensor Tenosynovectomy

The 2 physician groups sharply disagree on the effectiveness of prophylactic surgical procedures for RA disease (Table 4). The greatest difference in perceived effectiveness of procedures between specialists involved extensor tenosynovectomy. Surgeons were 13.2 and 11.3 times as likely to respond favorably to the procedures' ability to prevent tendon ruptures and recurrent synovitis, respectively, compared with rheumatologists. Ninety-three percent of hand surgeons believe extensor tenosynovectomy is an effective treatment for the prevention of tendon rupture when diffuse dorsal tenosynovitis is present compared with just over half of rheumatologists (93.2% vs 54.6%, respectively; $p < .0001$). Furthermore, significantly more surgeons than rheumatologists believe in the ability of small joint synovectomy to decrease pain

(52.5% vs 12.6%, respectively; $p < .0001$) and delay joint destruction (63.9% vs 26.1%, respectively; $p < .0001$).

Distal Ulna Resection

Respondents significantly disagreed on all of the potential benefits of distal ulna resection in the RA population (Table 5). Hand surgeons and rheumatologists had the smallest relative differences in opinion regarding the prevention of tendon ruptures (79.9% vs 61.4%, respectively; $p < .0001$; odds ratio [OR], 3.0) and improvement in wrist strength (23.6% vs 18.1%, respectively; $p = .039$; OR, 1.3). The largest difference in opinion involved the procedure's ability to improve wrist supination and pronation (72.0% surgeons vs 23.4% rheumatologists; $p < .0001$; OR, 9.0).

Other

Table 6 displays the attitudes of physicians toward wrist fusion and soft tissue reconstruction for swan-

Table 6. Characteristics of Survey Respondents, Hand Surgeons, and Rheumatologists

	Hand Surgeons (n = 280)	Rheumatologists (n = 235)	p Value
Age			
Mean \pm SD (y)	52.8 \pm 9.5	52.1 \pm 3.5	.25
Gender			
Men (%)	92.9	86.3	.01
Subspecialty interaction			
Does a rheumatologist/hand surgeon evaluate patients with you in your clinic? Yes (%)	9.6	12.4	.33
Do you have an active referral exchange with a rheumatologist/hand surgeon? Yes (%)	78.3	81.2	.55
During your training, did you rotate on a rheumatology/hand surgery rotation? Yes (%)	33.1	20.5	<.01

neck and boutonniere deformities for RA patients. In all areas (pain, function, aesthetics), hand surgeons rate the procedures as notably more effective than rheumatologists. In particular with wrist fusion, surgeons compared with rheumatologists were 21 times as likely to respond favorably toward the procedure's ability to decrease pain and 11 times as likely to respond favorably toward the procedure's ability to improve function.

Multivariate Analysis

Logistic regression models were done to predict positive attitudes toward surgical procedures by using a specialty group indicator as the main independent variable, while adjusting for the respondent's age and gender. The only influential variable on attitudes was the specialty, which was highly statistically significant as shown in the simple bivariate relationship shown in Tables 1 and 3 through 5. In a separate model for the rheumatologists only, neither their exposure to hand surgery currently nor during their training was found to be associated with positive attitudes toward surgical procedures.

Discussion

The surgical management of rheumatoid hand deformities in the United States is characterized by large variations in practice patterns, limited outcomes research, and now highly diverging attitudes of physicians caring for this patient population.^{13,16,24} The markedly conflicting attitudes of physicians toward the effectiveness of RA hand surgery are deeply seated within the specialties of hand surgery and rheumatology and appear constant across the age generations. In addition exposing rheumatologists to hand surgery does not seem to influence attitudes toward surgical effectiveness.

The management of the rheumatoid hand has a controversial history, characterized by rheumatologists and hand surgeons debating the efficacy of surgical intervention.⁹⁻¹³ In 1967 an international meeting was held between hand surgeons and rheumatologists to discuss the efficacy of synovectomy procedures in RA patients. Both groups of physicians agreed that synovectomy procedures were generally performed too late and that more case-controlled research trials were warranted.²⁴ Surgeons, however, continued to be frustrated with delayed rheumatology referrals. Nalebuff,²⁴ an orthopedic surgeon, echoed the sentiments of many surgeons in the 1980s by

stating that surgeons "should be part of any team managing the patient with arthritis, not a 'course of last resort' called upon when all else fails." Now 2 decades later dramatic advances have been made in the medical therapy of RA with the expanded range of effective disease-modifying antirheumatic drugs. Although it may be too early to describe the effects that newer disease-modifying antirheumatic drugs will have on the natural history of RA, these new medications may change the indications and timing for surgical intervention. These advances in the medical management of RA have been accompanied by minimal research on physicians' attitudes toward the role of surgery in the chronic disease management of RA.

The rheumatology literature suggests that extensor tenosynovectomy and small joint synovectomy procedures are now secondary salvage treatments. The opinion that they should not be used as a prophylactic modality²⁵ is reflected in the attitudes of the rheumatology survey responders of our study. Of rheumatologists, only 12.6% (vs 52.5% of surgeons) believe that small joint synovectomy delays joint destruction and only 26.1% (vs 63.9% of surgeons) believe that the procedure decreases pain. For extensor tenosynovectomy almost all of the surgeons (93.2%) believe the procedure prevents tendon rupture compared with only 54.6% of rheumatologists. In fact one rheumatologist wrote on the survey, "Bottom line, you cannot cut this disease out!" This contrasts dramatically to the surgical literature, which portrays extensor tenosynovectomy as an emergent procedure for the prevention of tendon damage and rupture.²⁶ To highlight the polarity in the 2 specialists' conceptualization of rheumatoid disease management, Wynn Parry and Stanley²⁶ made the following comment regarding small joint synovectomy, "'Too late' are the saddest words in the English language. They need not any longer be applied to the rheumatoid hand." These opposing attitudes now appear as widespread beliefs within the specialties of hand surgery and rheumatology.

Another frequently debated surgical intervention is MCP joint arthroplasty. Since the advent of flexible silicone implants in the 1960s, MCP joint arthroplasty has received wide acceptance among surgeons and has been accompanied by research showing predictable beneficial results.²⁷ A previous review of the outcomes of MCP joint arthroplasty procedures by Chung et al¹⁴ supports the benefits of the intervention, with improvements in hand function, arc of finger motion,

correction of ulnar drift, pain, and aesthetics. In addition, MCP joint arthroplasty procedures are among the most common joint replacement surgeries performed in RA patients.⁸ The attitudes of treating physicians toward MCP joint arthroplasty are highly specialty dependent because hand surgeons rate the procedure as markedly more effective for all outcome domains compared with rheumatologists. These opposing attitudes of hand surgeons and rheumatologists are not limited to synovectomy and arthroplasty procedures, but are significantly different for all the surgical procedures included in the survey. One rheumatologist seemed to describe the general attitude of rheumatologists toward hand surgery when the respondent wrote on the survey, "It has been my experience that most hand surgeries are unsuccessful or at least give poor results."

We looked for an age effect on attitudes because technology with arthroplasty materials and medical therapy has made important advances in rheumatoid arthritis. We hypothesized that younger rheumatologists exposed to recent technologic advancements during training may have more favorable attitudes toward arthroplasty procedures, and surgeons trained during the era of disease-modifying antirheumatic drugs may have less favorable attitudes toward synovectomy and tenosynovectomy procedures. Age did not have an effect on the attitudes of rheumatologists or hand surgeons, which is consistent with orthopedic research on physicians' attitudes.²⁸ Younger physicians who may potentially have more exposure to the most recent advances in clinical research have the same attitudes as older physicians. Potential reasons for the similarities in attitudes across generations are (1) outcome data are not available, (2) outcome data are available and not disseminated, (3) outcome data are disseminated but not adopted by the practicing physician, or (4) data are disseminated and adopted equally across generations.²⁸ Only 19.0% of rheumatologists and 54.5% of hand surgeons believe that high-quality information exists regarding the surgical options and outcomes for rheumatoid hand deformities, implicating a lack of information as the reason for similarities in physician attitudes across generations.

Despite the limited evidence-based research available, physicians must counsel patients on the medical and surgical options for rheumatoid disease. Despite efforts to provide unbiased information, the physician has immense influence over the patient's decision-

making process.²⁹ Many areas of medicine provide examples of specialists advocating conflicting management approaches.³⁰⁻³² For example urologists and radiation oncologists have markedly different attitudes regarding the most effective treatment for prostate cancer, and not surprisingly each specialist strongly believes in the type of care he or she provides. Similar controversies exist between cardiac surgeons and cardiologists.³³ Arthritis is no exception. Canadian researchers have found substantial differences in the attitudes of family physicians and rheumatologists regarding the indications for referring patients with osteoarthritis to orthopedic surgeons for knee replacement surgery.³⁴ In a similar fashion we now have evidence that hand surgeons and rheumatologists have markedly divergent opinions regarding the surgical management of RA hand disease, regarding both the end-stage procedures such as MCP joint arthroplasty and the prophylactic synovectomy and tenosynovectomy procedures. Physicians' attitudes may be apparent when counseling patients. The level of enthusiasm from the physician for either medical or surgical therapy may influence the decision-making process for the patient. We do not know how informed patients are regarding treatment options, and we do not know how much influence physicians have regarding the treatment decisions that rheumatoid patients make. More information is needed on patients' decision-making processes.

The United States health care system has undergone restructuring, with a new effort to design patient flow through a process of primary care gatekeeping.³⁵ The gatekeeper model has improved the appropriateness of care provided to many patient populations. With this model, however, surgical referrals are most often controlled by the primary care physician, and for adult RA patients that may involve the family physician, internist, or rheumatologist. Therefore communication between specialists is of utmost importance to create a synergistic treatment approach. As discussed earlier interspecialty divergence of opinion is not unique to RA, and other physician specialty groups experiencing these same issues have recommended multispecialty panels to clarify and disseminate appropriate treatment guidelines to physicians until the clinical evidence is more clearly defined.³⁴

The issue of bridging the 2 specialties has been discussed in the medical education process and the clinical arena with combined hand clinics. Many or-

thopedic training programs are now incorporating rheumatology rotations, and this is evident in our survey because 33.1% of hand surgeons have had exposure to rheumatology (compared with only 20.5% of rheumatologists exposed to hand surgery). One might argue that rheumatologists need more exposure to hand surgery because they are often in charge of the referral process. Our study does not show evidence that past or current exposure to hand surgery changes rheumatologists' attitudes toward surgery. Nevertheless the dissemination of outcomes research may be aided by a multidisciplinary approach to education and clinical practice because multidisciplinary panels have been shown to blunt subspecialty treatment biases.³³

This survey research has limitations. The self-reported attitudes of these physicians may not translate into actual practice patterns, which were not measured in this study. In addition a nonresponse bias may confound the results. If the nonresponders had beliefs about surgical effectiveness that were in the opposite direction of the responders, the magnitude of the survey results would be overestimated. The attitudes between hand surgeons and rheumatologists were extremely opposed and the addition of responders who were less likely to have their specialty's attitudes would not likely change the significance of the results, only the magnitude in differences.

In summary rheumatoid patients have 2 groups of highly trained medical and surgical specialists caring for them, but the specialists fundamentally disagree regarding the effectiveness of surgery for hand deformities. The attitudes of the physicians are specialty based and unaffected by physician age or, for rheumatologists, exposure to hand surgery. Both groups agree, however, that surgical outcomes research for this patient population is limited. We need a greater research focus on the outcomes of surgical interventions for rheumatoid deformities, followed by efforts aimed at the dissemination of the resulting data and implementation of logical treatment approaches. Until evidence-based practice can be established, multidisciplinary panels are needed to develop a consensus on treatment strategies among physicians treating the RA population.

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