Surgical-Physiotherapist Communication Must Be Improved in Rotator Cuff Repair Rehabilitation: An Electronic Survey of Physical Therapists on Postoperative Rehabilitation Protocols and Communication with Treating Surgeons

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E-pub: 03/01/2021

INTRODUCTION

Rotator cuff pathology is one of the most common musculoskeletal dysfunctions seen today. Rotator cuff dysfunction associated with pain and weakness directly diminishes a patient’s functional ability and can affect a patient’s quality of life substantially. Whether the treatment intervention is surgical or conservative, many surgeons may have differing opinions on the type of rehabilitation protocol. With the rate of postoperative retears ranging from 4% to nearly 100%, the outcomes continue to be variable and inconsistent. Studies have shown that rotator cuff retears occur primarily during weeks 6 to 26 after shoulder surgery. With the majority of postoperative patients undergoing some form of formal rehabilitation, the timelines for these retears occur while under the care of both physical therapist and surgeon. Currently, the most common tool in managing patients is a postoperative protocol; however, rehabilitation protocols tend to vary considerably among health-care providers and are frequently based on clinical experience and expert opinion rather than a standardized and universally accepted protocol. The goal of this study was to investigate the current concepts regarding postoperative rotator cuff protocols and to assess the state of communication between the referring surgeon and the physical therapist.

MATERIALS AND METHODS

Online surveys were conducted over a 2-year period of physical therapists who commonly treat rotator cuff injuries. These surveys were distributed via email lists obtained through various physical therapy networks across the United States. Individual physical therapist participation was voluntary. The questionnaires consisted of demographic questions regarding the education level of the physical therapist, and which orthopedic and physical therapy journals they read, as well as knowledge-based questions about rotator cuff tears and protocols they use. Participants were also asked about how they communicated with the treating surgeon and about their thoughts on causes of retear. The surveys were performed by a commercially

ABSTRACT

Background: There is no consensus on postoperative rotator cuff repair protocols in orthopedic or physical therapy literature. Despite surgical management, the frequency of rotator cuff retears continues to be high.

Objectives: This study is designed to investigate the current concepts of postoperative rehabilitation and to evaluate the state of communication between referring surgeons and treating physical therapists.

Methods: A survey was conducted over a 2-year period, performed by an online survey company.

Results: Six hundred responses were obtained from physical therapists. Most rehab protocols were based on size of tear, tissue quality, and open versus arthroscopic repair. Current intervention concepts and professional experience guided protocol development. Thirty-three percent of therapists receive operative notes ≤ 25% of the time. Sixteen percent reported not receiving operative notes and not having access to the physician >50% of the time. Most patients were seen within 2 weeks, with passive range of motion started in 83% of cases. Sixty percent started active-assist range of motion at ≤ 4 weeks. Sixty-four percent of therapy was continued for 12 to 16 weeks. Patient compliance, poor tissue quality, and rapid rehab progression were reported as common causes of failure.

Conclusion: Most rehabilitation programs follow protocols developed by surgeons and physical therapists. Tissue quality, size of tear, and repair type are usually documented in the operative report, and are rarely conveyed to the therapist. This study highlights the lack of communication between the physician and the therapist. Improving communication regarding the findings at surgery, opening lines of communication, and making alterations to the protocol may improve patient outcomes.

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Keywords: orthopedic, physical therapy, rehabilitation, rotator cuff, shoulder, surgery

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available online survey company (Survey Monkey), which provided data acquisition and analysis.

RESULTS

Demographics

A total of 600 responses were obtained. The study was distributed nationally: Northeast, 15.2% (91 of 598); from the Mid Atlantic, 8.4% (50 of 598); Southeast, 14.7% (88 of 598); Midwest, 22.1% (132 of 598); Southwest, 9.9% (59 of 598); West, 22.9% (137 of 598); and Northwest, 6.7% (41 of 598). Of the respondents, 55.6% (332 of 597) did not claim specialty certification, 27.3% (163 of 597) were orthopedic clinical specialist certified, and 19.9% (119 of 597) were sports clinical specialist certified. Sixty-four percent (385 of 600) of the respondents were doctors of physical therapy, 17.7% (106 of 600) had a master’s degree in physical therapy, 19% (114 of 600) had a bachelor’s degree, 10.5% (63 of 600) were in accredited clinical residency programs, 3.8% (23 of 600) were in accredited clinical fellowship programs, and 7.3% (44 of 600) were described as “other.” Forty-six percent (273 of 593) of the respondents worked in a private practice outpatient setting; 30% (175 of 593), in an outpatient hospital-based practice; 13% (78 of 593), in outpatient corporate practices; 6% (39 of 593), in physician-owned practices; and 4% (26 of 593), in educational/research institutions.

The focus for scholarly research for nearly all therapists was in reviewing physical therapy journals such as the Journal of Orthopaedic and Sports Physical Therapy (95.5%, 571 of 598) and the Physical Therapy Journal (56%, 355 of 598). There was less focus on orthopedic surgery journals; only 37% (220 of 598) reviewed the American Journal of Sports Medicine, 15% (87 of 598), the Journal of Bone and Joint Surgery, and 11% (65 of 598), the Journal of Shoulder and Elbow Surgery.

Therapist Opinions Regarding Rotator Cuff Repairs

Therapists were questioned about the types of rotator cuff repairs and what they felt were the important factors in the success of the repairs. Forty-two percent (245 of 588) did not know whether a single-row repair or a double-row repair was stronger, 41% (242 of 588) believed the double-row repair was stronger, 14.8% (14 of 588) believed there was no difference, and 2.4% (87 of 588) believed the single-row repair was stronger (Figure 1). Eighty percent (461 of 572) did not alter their rehab program based on the type of repair, but 77% (445 of 578) did alter their protocol based on open versus mini-open versus arthroscopic repair techniques. Ninety-three percent (434 of 533) reported they would alter the protocol based on tear size, and 95% (503 of 530) would alter based on tissue quality. The therapists ranked the following factors used in determining the rate of rehab progression from most to least important (from 1–7, with 7 being least important): For 549 respondents, the size of the tear ranked 5.85 on average; tissue quality, 5.62; age, 3.85; location of tear, 3.76; concomitant surgery, 3.71; patient activity level, 3.08; and type of repair, 2.4 (Figure 2).

Rehabilitation Program Development

Eighty-seven percent (465 of 533) of therapists use rehabilitation guidelines/protocols, with 63% (299 of 477) of these developed between the surgeon and therapist, 16% (75 of 477) completely physician directed, and 13% (62 of 477) developed by consensus guidelines. Seventy-three percent (340 of 467) of the protocols were evidence/literature based, but 27% (127 of 467) were not. Of the literature-based responses, 46% (116 of 254) were based on citations from the Journal of Orthopaedic and Sports Physical Therapy; 18%
(46 of 254), from the American Journal of Sports Medicine; 11% (28 of 254), from Journal of Bone and Joint Surgery; and 9% (23 of 254), from Journal of Shoulder and Elbow Surgery. Therapeutic interventions were influenced primarily by current intervention concepts and professional experience as opposed to animal model studies of rotator cuff healing (Table 1).

### Physician Communication

The study also examined the level of communication that exists between therapists and physicians, and how treatment progression decisions are made. One-third (171 of 520) of respondent therapists receive operative notes 25% of the time or less (Figure 3). Sixteen percent (83 of 506) of therapists reported not receiving operative notes or having access to the physician more than 50% of the time. More than 75% (372 of 469) of the therapists reported contacting the treating surgeon by phone or email with treatment progress and planning, and 12% (54 of 469) ask the patient about treatment progression and planning (Figure 3 and Figure 4). Current literature (69.7%, 327 of 469) is used more commonly than physician communications (physician phone call, 54.16%, 254 of 469; physician email, 25.16%, 118 of 469) to make determinations to progress the rehabilitation. Physician communication did not differ overall by type of practice when comparing private practice settings to hospital–owned or corporate practices.

### Therapy Timing

As for when therapists start their rehabilitation protocols, 74% (402 of 539) of therapists see patients within 2 weeks postoperatively, with passive range of motion started in 83% (445 of 536) of cases. Sixty percent (322 of 533) of therapists started patients on active-assist range of motion at 4 weeks or less, and 56% (302 of 536) started active range of motion at 6 weeks or less. Sixty-four percent (322 of 500) of therapists continue therapy for 12 to 16 weeks. Submaximal isometric exercises were started at 2 weeks in 13% (70 of 533) of the respondents, at 4 weeks in 28% (151 of 533), and at 6 weeks in 28% (149 of 533). Isotonic strengthening was started at 8 weeks or earlier 55% (290 of 530) of the time. Scapular strengthening was started usually at or before 6 weeks (432 of 534) (Table 2).
Opinions on Causes of Failures

Physical therapists report that patient compliance (44%, 218 of 498), poor tissue quality (39%, 194 of 498), and rapid rehabilitation progression (6%, 28 of 498) are felt to be the major causes of failure (Figure 5). Residual pain (64%, 320 of 502) and stiffness (57%, 286 of 502) are the most common complaints therapists have after rotator cuff repair.

DISCUSSION

Rotator cuff repair surgery has the potential to improve patient function and decrease pain. Despite this, the risk of retear is a significant concern among orthopedic surgeons, as demonstrated in the literature.1-10 There are numerous potential reasons why surgery may fail, as poor tissue quality, tear size, and advanced patient age are variables not well controlled by the surgeon.

Discordance exists in the literature regarding whether early versus delayed range of motion has any benefit in functional range of motion and whether retear rates are affected.11 In animal models, recent studies have shown no difference in end range of motion and retear rates.10 Human studies revealed no significant difference in some studies,9 whereas others showed increased forward flexion in the early-motion groups, with an increased risk of retear for cuff tears > 3 cm, regardless of repair technique.12 Recent meta-analyses of multiple level I and level II studies revealed overall no difference in functional outcomes between groups or difference in retear rates.13-15 It is important to note that most of these studies did not control for medical comorbidities or intraoperative tissue quality that might have affected postoperative rehabilitation.

Although most meta-analyses concluded that early range of motion was of little detriment to patient outcome, in practice there is considerable debate among surgeons regarding the length of immobilization and speed of rehabilitation. Considering the conflicting data and differing opinions, it is unclear how physical therapists plan or adjust their rehabilitation protocols. The common postoperative protocol is for a physician to prescribe a rehabilitation program for the patient, and for that program to be executed by the therapist. With retears occurring primarily during the 6- to 26-week postoperative period, improvements in postoperative rehabilitation must be made to increase the success rate of rotator cuff surgery.3,5

Communication between surgeon and therapist seems to be a “weak link” in the process. Although rehabilitation protocols streamline the referral process to physical therapy, the protocols may be generic and may not consider the variables that may affect greatly the success of the surgery. This study demonstrated that therapists often do not have access to patients’ operative notes and are not able to communicate with the surgeon, as one-third of respondent therapists received operative notes 25% or less, and 16% of therapists reported not receiving operative notes and not having access to the physician more than 50% of the time. These results reflect a significant number of cases when the specifics of the patient are not communicated to the therapists. In these circumstances, there may be cases

| Table 2. Reported timeline in initial evaluation and rehabilitation protocols |
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| Clinical Metrics | POD1 | 1 wk | 2 wk | 3 wk | 4 wk | 5 wk | 6 wk | 7 wk | 8 wk | 9 wk |
| Initial evaluation | 8.4% | 39.9% | 26.4% | 8.7% | 16.7% | 12% | 2% | 0% | 0% | 0% |
| PROM | 56.2% | 26.9% | 13.1% | 3.4% | 0.4% | 0% | 0.2% | 0% | 0% | 0% |
| AROM | 2.8% | 9.1% | 48.6% | 34.0% | 4.3% | 0.8% | 0.6% | 0.6% | 0.6% | 0.6% |
| Scapular strengthening | 22.5% | 17.4% | 21.5% | 19.5% | 10.5% | 2.4% | 2.6% | 0.6% | 3.0% | 3.0% |
| Submaximal isometrics | 13.1% | 28.3% | 28.0% | 13.5% | 5.1% | 4.5% | 0.3% | 7.1% | 7.1% | 7.1% |
| Isotonic strengthening | 3.2% | 18.5% | 33.0% | 14.3% | 25.3% | 5.7% | 5.7% | 5.7% | 5.7% | 5.7% |
| How long treated | 0.0% | 0.0% | 0.0% | 0.0% | 5.4% | 28.0% | 36.4% | 13.6% | 10.4% | 6.2% |

AAROM = active-assist range of motion; AROM = active range of motion; POD1 = postoperative day 1; PROM = passive range of motion.
were repairs may be tenuous or less likely to heal, such that a "standard" therapy protocol may not be appropriate. Most therapists alter their rehab protocol based on tear size, tissue quality, and type of repair (based on their responses), so having access to the surgeon’s operative notes and recommendations on therapy may improve patient outcome.

An effective method for improving the communication process can be found in the physical therapy prescription. These prescriptions may vary from being patient-specific instructions to generic prescriptions that read “evaluate and treat” or “rotator cuff repair protocol,” without guidance with regard to range of motion and weight-bearing limitation, or suggestions for what modalities might benefit the patient’s rehabilitation. Communication of the findings at surgery (tissue quality, size of the tear, type of repair, and concurrent procedures) and specific changes to be made in the standard protocol could be included in the rehab prescription. More specific guidelines may be helpful in optimizing a patient’s rehabilitation potential and may decrease the rates of retear via overly aggressive therapy exercises.

Another method to improve communication and patient outcomes is for the operating surgeon to provide more descriptive information in their operative notes regarding the quality of the rotator cuff, the size of the tear, and the type of repair performed. The operative notes could then be used as a way of transmitting these operative findings to both patient and therapist. Forty-seven percent of therapists in this study stated they receive operative notes 50% or less of the time. Without operative notes, there may be a discordance between physician goals, therapist goals, and the timeline of therapy.

The commonly accepted variables affecting rotator cuff repair discussed earlier can alter substantially the speed at which therapy is progressed. This study discovered that 87% of the therapists used rehabilitation guidelines or protocols, with 74% of patients being seen within 2 weeks of surgery, and 83% of patients started passive range of motion within that 2-week time frame. This may not be appropriate for all patients, especially those with larger tears or poor tissue quality. Because there is no consensus in the literature about rehabilitation protocols and because each patient presents a unique circumstance with regard to the specifics of his or her cuff tear and repair, there is an increased need for communication between surgeon and therapist. Most therapists altered the treatment plan based on the patient’s tear size and tissue quality, and whether the repair was open, mini-open, or arthroscopic. Failure to receive operative notes and the frequent inaccessibility of the surgeons thus prevented therapists from making informed decisions regarding the rehabilitation plan. Lack of communication may also increase the risk of inappropriate therapy protocols, especially in the case when therapists may not have orthopedic clinical specialist or sports clinical specialist certification, increasing the chance they are not familiar with commonly used rehabilitation protocols or risk factors for cuff retear.

Physicians and physical therapists both strive to obtain the best results for their patients. Unfortunately, highly technical surgical repairs with excellent prognoses are at risk for retear as a result of patient noncompliance, prematurely or overly aggressive rehabilitation programs, and lack of communication between surgeon and therapist. This study raises the question of whether improved communication and individualized patient-specific rehabilitation is possible, and, if so, whether it would improve patient outcomes in rotator cuff repair. In the study by Miller et al, 7 of 9 retears occurred within 3 months of surgery, and the other 2 within 6 months of surgery. Similarly, in the multicenter study of Iannotti et al,1 there was a 17% retear rate at a mean time of 19.2 weeks. In our study, 16% of therapists reported they did not receive communication from a surgeon or surgical operative notes. Therefore, in at least 16% of cases, there then exists the possibility of premature or inappropriate rehabilitation, which put the surgical repair at risk and hamper good patient outcomes.

A strength of this study is that it includes 600 respondents from across the country, in varied clinical settings and at different levels of training, which likely reflects the broad range of rehabilitation facilities available for patients. A limitation of this study is that it reports the knowledge, opinions, and attitudes of professionals on a condition for which there is no gold standard or consensus rehabilitation protocol. Future studies on the root causes of lack of communication may shed light on ways to improve collaboration between surgeons and therapists. Given the findings of this study, we recommend increased communication between physical therapists and orthopedic surgeons when treating rotator cuff repair, with the hope of decreasing the risk of iatrogenic rotator cuff retear and improving overall patient outcome.

Disclosure Statement
Mark Schultzel, MD; Karl B Scheidt, MD; Brian McNeill, DPT; Christopher M Klein, MS; and Colin Blout, BS: declare that no conflict of interest exists. These authors, their immediate family, and any research foundation with whom they are affiliated did not receive any financial payments or other benefits from any commercial entity related to the subject of this article. John M Itamura, MD, declares he has a history of receiving paid consulting fees from Acumed and Wright Medical. Dr Itamura, his immediate family, and any research foundation with whom he is affiliated did not receive any financial payments or other benefits from any commercial entity related to the subject of this article.

Authors’ Contributions
Mark Schultzel, MD, and John M Itamura, MD, participated in the study design, acquisition and analysis of data, critical review, drafting and submission of the final manuscript. Karl B Scheidt, MD, and Brian McNeill, DPT, participated in the study design.
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STROBE Declaration

The STROBE Statement’s guidelines have been adopted for this manuscript.

Funding

The authors received research funding for this project from the Kerlan Jobe Institute. The authors have no proprietary interests in the materials described in the article. No external sources of funding were used.

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