



# Agreement between patient self-assessment and physician assessment of shoulder range of motion

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**Background:** Shoulder outcome scores that include range of motion (ROM) and apprehension signs are limited by the need for direct involvement of the physician. Patient-reported outcome measures are patient centered and self-administered, and they can help physicians track the patient's progress between office visits and for long-term follow-up once the patient has been discharged.

**Methods:** Thirty consecutive patients completed a form before their 6-month follow-up after surgery on the labrum or capsule as a result of instability or pain related to instability. The form included bilateral ROM, apprehension, and instability episodes. The same parameters were measured by the physician during the visit. The patient's and physician's responses were compared. The primary outcome was the percentage agreement with exact and approximate agreement.

**Results:** Exact agreement was moderate for forward elevation at 56.6%; fair for abduction and external rotation at 90° at 24.5% and 34%, respectively; and poor for internal rotation at 90° and external rotation with the arm at the side at 2.6% and 12%, respectively.

Approximate agreement within a range of positive or negative 20° range was very good for forward elevation (94%), abduction (92%), and external rotation at 90° (87%); moderate for external rotation with the arm at the side; and fair for internal rotation at 90°.

There was 70% agreement regarding apprehension, 93% regarding subluxation events, and 100% regarding redislocation events.

**Conclusion:** Some measures of shoulder ROM showed a moderate to high level of agreement between patient-reported measurements and the physician's measurements. This method for short- and long-term follow-up could potentially replace routine clinic visits.

**Level of evidence:** Level III; Diagnostic Study

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**Keywords:** Shoulder physical examination; range of motion; patient-reported outcome; self-assessment; apprehension sign; agreement study

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Patient-reported outcome measures have become increasingly important in the orthopedic literature to show the impact that a treatment has on quality of life and function from a patient's perspective.<sup>8</sup> Whereas this is important, physical examination measures, such as range of motion (ROM) and

strength, are also important.<sup>7</sup> Physical examination measures are more difficult to collect because of the need for hands-on physician examination.<sup>1</sup> Therefore, studies including these physical examination measures are more challenging and expensive to conduct, especially when patients have moved, have limited mobility or transportation, or are reluctant to come for follow-up. In addition, the logistics of arranging in-person follow-up can be a strain on the resources of the research team.

Tracking and quantifying patients' objective progress after surgery or treatment without the need for the patients to be physically present in the clinic for their follow-up could be achieved with the use of patient-reported outcomes and patient-administered physical examination measures that are completed at home and delivered to the physician's office by mail, secure e-mail, or Internet-based reporting sites.<sup>1</sup> This method could potentially help increase the compliance of patients, especially with long-term follow-up. This can decrease the resources needed to do research, decrease both direct and indirect costs to the patients,<sup>12</sup> and increase the productivity of the physician's office by freeing more space to see new patients. This will allow the physician to follow up on the established patients on a long-term basis.

The use of patient-reported ROM and strength in patients undergoing shoulder surgery has been shown to provide a high level of agreement with the surgeon's assessment of shoulder function and ROM.<sup>10</sup> Some authors have even suggested that these could be used interchangeably or even replace clinician-based questionnaires for subjective and objective evaluations.<sup>6</sup> The purpose of this study was to determine the agreement between patient and physician assessment of shoulder motion and provocative maneuvers in postoperative shoulder instability patients.

## Materials and methods

Patients included were a subgroup of the Multicenter Orthopaedic Outcomes Network (MOON) shoulder instability cohort at their 6-month postoperative follow-up appointment. These patients had previously undergone surgery on the labrum or capsule as a result of instability or pain related to instability. Patients with anterior and posterior instability were included.

At their 4- to 6-month postoperative appointment, the patients were asked to complete a form that had the patient assess his or her own bilateral ROM, apprehension, and whether any shoulder instability episodes had occurred (Fig. 1). The form was based on the MOON shoulder questionnaire that is used by surgeons to record ROM at preoperative and postoperative appointments. The patients completed the form in the examination room, before their clinical encounter, to avoid influence of the physician's evaluation on the patient's self-assessment; this was thought to mimic a situation in which the patient would be completing the form without the assistance of a health care provider. The physicians were blinded to the results of the patient's self-evaluation.

## Results

Percentage agreement between patients and physicians was used to analyze continuous variables.<sup>2</sup> Percentage agreement was determined by calculating the proportions of exact and approximate agreement. The patient's and physician's responses could be exactly the same (exact agreement) or could lie within a range that could be considered acceptable ( $\pm 10^\circ$  or  $20^\circ$ ).<sup>10</sup> We used parameters as described by Sasyniuk et al to categorize agreement ranging from perfect to none as described in Table I.<sup>9</sup>

Thirty patients were evaluated (22 male) with an average age of 21.4 years (median, 18.0; range 14-54). The calculated body mass index for these patients had an average of 25 (range, 20-37). Sixteen patients had some high-school education, 5 had completed high school, and the remaining 9 had at least some higher education. The affected shoulder was the right shoulder in 16 cases. Eighteen patients underwent arthroscopic anterior Bankart repairs; 11, arthroscopic posterior labral repairs; 6, superior labral anterior-posterior lesion repairs; 1, open Latarjet procedure; and 1, open posterior capsulorrhaphy.

Exact agreement was moderate between physicians and patients regarding active forward elevation (FE) at 57%. Exact agreement was poor for abduction (ABD) and external rotation at  $90^\circ$  of abduction (ER $90^\circ$ ) and very poor for external rotation with the arm at the side (ER) and internal rotation at  $90^\circ$  of abduction (IR $90^\circ$ ). Data on the exact and approximate agreement can be seen in Table II.

Approximate agreement for FE was very good with  $\pm 10^\circ$  and  $\pm 20^\circ$  at 94%. This was the highest agreement for ROM. Approximate agreement was good at  $\pm 10^\circ$  and very good  $\pm 20^\circ$  for ABD (77% and 92%, respectively) and ER $90^\circ$  (75% and 87%, respectively). Approximate agreement for ER was poor at  $\pm 10^\circ$  with 39% and moderate at  $\pm 20^\circ$  with 59%. Approximate agreement was very poor for IR $90^\circ$  at  $\pm 10^\circ$  with 13% and poor at  $\pm 20^\circ$  with 23%.

When there was lack of agreement between physicians and patients, patients tended to list greater ROM than physicians did. The percentages for overestimation and underestimation for different ROMs are listed in Table III.

On analysis of the differences noted between the surgical side and the contralateral side, there were some interesting findings in perception of ROM between surgeons and

**Table I** Patient and physician agreement categories

Value of agreement	Strength of agreement
0%	None
1%-20%	Very poor
21%-40%	Poor
41%-80%	Good
81%-99%	Very good
100%	Perfect

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