A new instrument to measure the activity profile of elderly shoulder pathology patients: The Senior Shoulder Activity score (SSA score)

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Shoulder assessment; Quality of life; Senior activity level

Summary

Introduction: Whether rotator cuff repair is indicated in an elderly subject depends on the patient’s activity profile and functional demand. A Senior Shoulder Activity (SSA) score is described, as a support for indications and analysis of clinical results according to activity level.

Material and method: The SSA score, comprising 4 levels from “sedentary” to “very active”, was validated by comparison against a control group of 113 asymptomatic patients. It was included in the protocol of the French Arthroscopy Society’s comparative study of repair versus simple decompression in 143 rotator cuff tears. Recovery of activity was assessed according to procedure.

Results: At 1-year follow-up, suturing was associated with recovery of previous activity level in 87% of the cases and in 80% for decompression, a non-significant difference. When, however, less active patients (SSA 1 and 2) were contrasted with the more active (SSA 3 and 4), clinical results with suture versus decompression on Constant score showed a greater difference in the SSA 3–4 group.

Discussion: The SSA score is not the same as the activity item of the Constant score, as it assesses the patient’s usual activity level, before symptom onset, whereas the Constant item assesses activity at a given moment, independently of the patient’s normal activity profile.

Conclusion: The Senior Shoulder Activity score is a simple, reproducible complement to the Constant score, revealing differences in clinical results on the latter, according to activity profile. Rotator cuff repair or simple decompression provided recovery of previous SSA activity
level in more than 80% of the cases. The difference in clinical results between the two was significantly greater in more active patients. It would seem to follow that suture is more beneficial for more active subjects while simple decompression may be suitable for those with lower functional demand.  

*Level of evidence II:* Prospective, randomized, low-power study.  
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**Introduction**

Many studies have demonstrated better functional recovery with tendon repair than decompression alone in elderly patients with rotator cuff tear [1—10]. Population aging and the more active life of the elderly lead to higher expectations of functional recovery; the French Arthroscopy Society (SFA) therefore conducted a clinical study of rotator cuff repair in the over 70s.

Some 40–shoulder assessment scales are to be found in the literature [11], but none are especially adapted for the elderly and none quantify an individual patient's usual activity profile. We felt that it was important to be able to determine activity profiles, as they represent the patient's functional demand and set the postoperative target [12]. We therefore drew up a Senior Shoulder Activity (SSA) score to assess shoulder function demand in the elderly and compare results between cuff suture and decompression in terms of resumption of activities in a comparative study for the SFA symposium.

**Material and method**

**Method**

A preliminary survey of patients undergoing rotator cuff surgery identified a certain number of physical activities that are important to resume postoperatively for patients aged over 70 years: housework, handiwork, gardening and sports. These were classified into 4 levels, describing activity profiles ranging from most sedentary to most active:

- level 1: sedentary: no housework, handiwork, gardening or sport involving the shoulder;
- level 2: occasionally active: occasional light housework, handiwork and gardening, but no sport involving the shoulder;
- level 3: active: daily housework, regular (2–3 times per week) gardening or handiwork, but no sport involving the shoulder;
- level 4: very active: daily gardening or handiwork, and sports involving the shoulder.

We then investigated whether the activity level distribution of rotator cuff tear patients matched that of the general population. SSA was scored in a control group of 113 asymptomatic patients aged more than 70 years, who were questioned in the waiting rooms of the various surgery departments taking part in the SFA symposium for a locomotor condition not involving the shoulder.

The SSA score was of course incorporated in the SFA symposium's prospective comparative study of cuff repair versus decompression. At the first consultation, the examiner sought to establish the patient's activity level before the onset of cuff pathology, and it was reassessed at the final follow-up consultation at 1 year.

Preliminary analysis checked activity level distribution homogeneity between the control (general population) and study patient groups. Secondly, the efficacy of the 2 types of treatment was analyzed in terms of individual recovery of pre-onset activity level.

Finally, results in terms of Constant score were compared between suture and decompression at each level of activity [13–17], indicating suture for the more active patients and simple decompression in the more sedentary.

**Population**

The control group comprised 113 patients, with a mean age of 78 years, with the following distribution: 15 patients (13%) level 1 (sedentary), 52 patients (46%) level 2 (occasionally active), 35 patients (31%) level 3 (active) and 11 patients (10%) level 4 (very active).

The prospective randomized study of rotator cuff suture in over 70-year-olds comprised 143 patients (73 decompressions, 70 sutures), with a minimum 1-year’s follow-up, and a mean age of 74.6 years (±3.3). Preoperative assessment focused on pre-onset activity level: there were (5%) at level 1 (sedentary), 54 (38%) at level 2 (occasionally active), 55 (38%) at level 3 (active) and 27 (19%) at level 4 (very active).

*Fig. 1* compares the control and comparison groups: activity level distribution appeared comparable (*Fig. 1*).

Statistical analysis also found good homogeneity between suture and decompression groups, with respectively 2% and 8% level 1, 36% and 40% level 2, 38% and 38% level 3, and 17% and 10% level 4 (*Fig. 2*).

**Results**

**Recovery of activity level**

At latest follow-up, 16% of the overall comparison group (suture plus decompression) had fallen by 1 activity level, 65% had recovered their usual level and 19% had actually risen by 1 level over their previous situation: i.e., 84% of...
Activity not 87% stant recovered SSA the level.

Constant significant, patients, of profile suture score [13—17] Figure 1 Comparison versus control groups per SSA activity level.

Suture versus decompression.

Figure 2 Suture versus decompression.

Recovery of activity level.

Figure 3 Recovery of activity level.

the patients, whether managed by suture or decompression, recovered their senior activity; suture allowed recovery in 87% of cases and decompression in 80%. This difference was not significant, but pointed to a tendency for better recovery with suture (Fig. 3).

Correlations between Constant and SSA scores

SSA profile was compared to weighted Constant score at 1 year, revealing a strong correlation [13—17] (Table 1).

To analyze differential clinical results in terms of Constant score [13—17] between suture and decompression with respect to activity level, the patients were grouped as less (levels 1 and 2) versus more active (levels 3 and 4).

Table 1 Correlation between Constant score (mean ± SD) and activity level at 1 year.

<table>
<thead>
<tr>
<th>Level</th>
<th>Postoperative weighted Constant score</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Level 1</td>
<td>97.2 (± 17)</td>
<td>0.0001</td>
</tr>
<tr>
<td>Level 2</td>
<td>101.1 (± 17.6)</td>
<td></td>
</tr>
<tr>
<td>Level 3</td>
<td>110.2 (± 11.2)</td>
<td></td>
</tr>
<tr>
<td>Level 4</td>
<td>117.2 (± 10.8)</td>
<td></td>
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</tbody>
</table>

Constant scores associated with the two techniques differed significantly in both activity level subgroups, but much more significantly in the ’’more active’’ group (SSA 3 and 4): tendon repair appeared to provide greater benefit for more active patients (Table 2).

Discussion

In 2005, in a meta-analysis of 1106 reports published between 1992 and 2002, Harvie et al. found 44 different shoulder scales [11]. These scores are well suited to assess individual clinical and functional results, but do not take account of patients’ usual activity profile, which nevertheless varies greatly from patient to patient. For the SFA symposium, the European Constant score [13—17] was associated to the American ASES [18,19] and SST [20] scores, plus the new SSA score which does not assess clinical results but allows estimation of functional recovery of the patient’s usual level of activity and comparison of results between differing activity profiles.

In 2003, Kirkley et al. gave a precise description of 12 of the most widely used scores in clinical research [21]. None, however, were particularly adapted to the most elderly patients or took account of the importance of activity for the individual [11,21—30].

The SSA score might at first glance seem redundant with respect to the activity item of the Constant scale [13—17]. Preoperatively, the latter [13—17] assesses the degree of loss of activity against the patient’s baseline, whereas SSA ranks the patient’s usual activity before symptom onset. Post-operatively, the Constant activity item assesses recovery of usual activity [13—17], but without taking account of the sedentary versus active profile of the patient, whereas SSA reveals return to baseline, loss or gain.

To establish a pre-onset SSA score in a patient consulting after onset, the assessor needs to direct the interview so that the present symptoms and functional impairment do not bias the estimate of the patient’s usual level of activity.

As numbers in certain levels were small, 2 sub-populations (more versus less active) were defined so as

Table 2 Mean Constant score for suture vs decompression according to SSA sub-group.

<table>
<thead>
<tr>
<th>Levels 1 + 2</th>
<th>Suture</th>
<th>Decompression</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constant</td>
<td>75.62</td>
<td>69.02</td>
<td>0.018</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Levels 3 + 4</th>
<th>Suture</th>
<th>Decompression</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constant</td>
<td>82.66</td>
<td>77.35</td>
<td>0.0012</td>
</tr>
</tbody>
</table>
to achieve sufficient power for significant differences to be able to emerge between suture and decompression in each.

Conclusion

The Senior Shoulder Activity (SSA) score is a simple and reproducible complement to the Constant score, introducing an individual activity profile.

It reveals differences in clinical results on Constant score according to activity level.

Treatment, whether in the form of rotator cuff repair or decompression alone, restored the previous SSA activity level in more than 80% of over 70-year-old patients.

The differential in clinical results between suture and decompression was significantly greater in patients graded as more active on SSA. It probably follows that rotator cuff suturing is of greater benefit in more active patients and that decompression alone may be sufficient in more sedentary patients with lower functional demand.

Disclosure of interest

The authors declare that they have no conflicts of interest concerning this article.

References