



# Gender differences in expectations and outcomes for total shoulder arthroplasty: a prospective cohort study

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**Background:** Gender has an impact on the expectations and the outcomes of orthopedic procedures. The data examining the effect of gender on total shoulder arthroplasty (TSA) are limited but suggest that women may have worse outcomes. We performed a prospective comparison between men and women with regard to expectations and midterm functional outcomes for TSA.

**Methods:** The study prospectively enrolled 63 patients receiving a TSA with a minimum of 3 years of follow-up. The cohort included 36 men and 27 women with a mean age of 60.8 years for men (range, 37–79 years) and 66.4 years ( $P = .01$ ) for women (range, 52–77 years.) Each patient was given a preoperative survey in which patients were asked to select 3 expectations they most hoped to gain from surgery. Functional outcomes were measured with American Shoulder and Elbow Surgeons and 12-Item Short Form Health Survey scores.

**Results:** There were differences in expectations between the genders. Men chose exercise or participation in sports (24/36) whereas women chose to maintain daily routine and chores (18/27) ( $P < .01$ ) as their top expectation. Both, however, chose to sleep through the night similarly as the next most important expectation. Each achieved their expectations at similar and high rates. American Shoulder and Elbow Surgeons and 12-Item Short Form Health Survey scores, respectively, increased significantly but did not differ between genders.

**Conclusion:** TSA results in excellent improvement of functional outcomes for both men and women without a significant difference at midterm follow-up. Men, on average, are younger and value participation in sports. Women hope to improve their ability to do their daily routine and chores. Both value sleeping through the night.

**Level of evidence:** Level II; Prospective Cohort Design; Treatment Study

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A number of studies indicate gender differences in the outcomes of certain orthopedic procedures.<sup>16</sup> Specifically, some literature suggests that women have worse outcomes by certain measures after total shoulder arthroplasty (TSA). Donigan et al

found that female gender and revision shoulder arthroplasty predicted worse functional outcomes, whereas age, medical comorbidities, obesity, and preoperative range of motion did not.<sup>1</sup> Gruson et al found that female gender predicted higher transfusion rates after TSA.<sup>4</sup> Last, 2 large epidemiologic studies of TSA in the United States indicated that women have a significantly longer postoperative length of stay.<sup>2,11</sup>

In addition to the effects of gender, there is also increasing evidence that the patient's expectations are measurable and have an effect on outcomes. Henn et al showed in rotator cuff repairs that patients' preoperative expectations correlated with self-assessed outcomes.<sup>6</sup> For TSA patients, Styron et al showed a correlation between preoperative confidence and functional outcomes.<sup>14</sup> In the most relevant study, Henn et al showed that younger patients had higher expectations after TSA and that women and men had different expectations, with women placing a greater emphasis on improving psychological well-being and driving.<sup>5</sup> The implication is that differing expectations by gender may affect or explain different functional outcomes.

The purpose of this study was to prospectively evaluate any differences between men and women in *expectations* as well as in *outcomes* for TSA. This information may be useful in counseling patients for TSA, setting expectations, and possibly influencing patient-based outcomes. On the basis of the current literature, we hypothesized that men and women will have different expectations and that men would have better functional outcomes.

## Materials and methods

We prospectively studied consecutive patients undergoing unilateral primary TSA for osteoarthritis between 2007 and 2010 by a

single surgeon (S.M.) with a single implant (Stryker, Kalamazoo, MI, USA) at a single institution.

All patients who were scheduled for an anatomic TSA for osteoarthritis were asked to participate in the study, and no patients refused. Revision arthroplasty and TSA for inflammatory, post-traumatic, and postcapsulorrhaphy arthritis were excluded. The rotator cuff was confirmed to be intact by further imaging with either a computed tomography or magnetic resonance imaging scan. Each patient filled out a preoperative questionnaire and was asked to select the top 3 expectations for surgery on a list of 10 items of activities of daily living (Table I). In addition, the patients completed a visual analog scale for pain, an American Shoulder and Elbow Surgeons (ASES) questionnaire, and the 12-Item Short Form Health Survey (SF-12).

At a minimum of 3 years of follow-up, each patient rated the percentage at which he or she achieved each preoperative expectation and completed the visual analog scale, ASES, and SF-12.

## Statistical analysis

Descriptive statistics were calculated for continuous and categorical variables. Continuous variables were summarized by number of patients and mean, standard deviation, median, minimum, and maximum values in each cohort. For the continuous variables, the 2-sample *t*-test and Wilcoxon Mann-Whitney test were used to compare the cohort groups. The 2-sample *t*-test was used when the data were normally distributed; otherwise, the nonparametric method Wilcoxon Mann-Whitney was used. Categorical variables were summarized by numbers and percentages. For the categorical variables, the  $\chi^2$  test and Fisher exact test were performed. The analysis was based on collected data only, and no missing values were imputed. All statistical analyses were performed using SAS 9.4 (SAS Institute, Cary, NC, USA) software. The 2-tailed threshold of significance was set at  $P < .05$ .

**Table I** Comparison of preoperative expectations and achievement percentage for men and women

What are your expectations for surgery?	Women		Men	
	No. selected (%)	% Achievement (mean)	No. selected (%)	% Achievement (mean)
1. Use public transportation or drive	3 (11)	75	1 (3)	100
2. Independently perform household chores and daily routine*	18 (67)*	85	10 (28)*	90
3. Participate in recreational activities such as dancing, travel, and gardening	11 (41)	73	10 (28)	93
4. Exercise or participate in sports	12 (44)	83	24 (67)	79
5. Maintain social activities, caring for someone, playing with children	5 (19)	100	9 (25)	97
6. Easily change position, sitting to standing, standing to sitting	3 (11)	83	8 (22)	97
7. Ability to sleep through the night	17 (63)	90	24 (67)	88
8. Maintain employment	4 (15)	75	12 (33)	96
9. Maintain sexual activity	0 (0)		3 (8)	100
10. Maintain psychological well-being	3 (11)	100	4 (11)	88

\* Indicates a significant difference between men and women with  $P < .05$ .

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