

Psychologic Reasons for Patients Preferring Minimally Invasive Total Hip Arthroplasty

Lawrence D. Dorr, MD; Debra Thomas, MD; William T. Long, MD; Peter B. Polatin, MD;
and Leigh E. Sirianni, OPAC

Success of an orthopaedic operation depends on patients achieving their primary goal(s) and having satisfaction with the outcome. The enthusiasm of patients for minimally invasive total hip arthroplasty seems related to satisfaction with the operation. We hypothesized patients' attitude toward a small incision would increase their confidence and satisfaction with the operation but the importance of the incision would dissipate after patients realized their goals of pain relief and functional recovery. One hundred sixty-five patients responded to a 14-question patient-perception questionnaire preoperatively and 6 weeks postoperatively and a followup survey at 6 months to 1 year postoperatively. One hundred nine patients had small incisions (mean, 9.6 cm) and 56 had long incisions (mean, 17.9 cm). Preoperatively patients expected small-incision surgery would positively influence their primary goals and satisfaction; at 6 weeks postoperative they believed more strongly that this was true. By 6 months to 1 year, the importance of the incision diminished because 100% of patients met their primary goals. Forty percent of patients with a long incision were not satisfied and the reasons given were related to the process of reincorporating their injured hip into their whole-body image. We confirmed our first hypothesis that a small incision influences a patient's satisfaction postoperatively; we could not confirm our second hypothesis that incision length did not matter after attaining primary goals.

Level of Evidence: Level II, prognostic study. See the Guidelines for Authors for a complete description of levels of evidence.

Received: May 26, 2006

Revised: September 21, 2006; December 7, 2006

Accepted: December 19, 2006

From the Arthritis Institute, Inglewood, CA.

One or more of the authors had received funding from Orthopaedic Research and Education Foundation (DT) and Zimmer Inc (LDD).

Each author certifies that his or her institution has approved the human protocol for this investigation and that all investigations were conducted in conformity with ethical principles of research, and that informed consent for participation in the study was obtained.

Correspondence to: Lawrence D. Dorr, MD, The Arthritis Institute, 501 E. Hardy Street, 3rd Floor, Inglewood, CA 90301. Phone: 310-695-4800; Fax: 310-695-4802; E-mail: patriciajpaul@yahoo.com.

DOI: 10.1097/BLO.0b013e31803212dc

Several studies suggest there are three components to a successful orthopaedic operation: relief of pain, return of function, and satisfaction in the outcome.^{1,3,4,6,11} Hudak et al^{3,4} studied satisfaction in patients having orthopaedic treatment and defined satisfaction as having a result that could be lived with unselfconsciously. The mood and attitudinal factors of stress, anxiety, and depression influence recovery after orthopaedic surgery.¹¹ Iverson et al⁶ studied the effect of attitude with spinal stenosis surgery and found positive expectations were associated with all three components: pain, functional recovery, and self-ratings of recovery. Mahomed et al⁸ reported patient expectations of complete pain relief after total knee replacement or total hip replacement predicted better functional outcome; the importance of patient expectation was the second most important determinant of outcome. Hudak et al⁴ reported patients who exceeded their most important preoperative expectation of hand surgery have the best postoperative satisfaction.

Throughout the history of total hip replacement, a high percentage of patients have achieved their primary goals of pain relief and return of function. However, we were curious why our patients had such a positive attitude about small-incision surgery when available data suggested no better pain relief or function results.^{7,12} We suspected this attitude was related to the third component of outcome: satisfaction.

We therefore hypothesized that patients' perceptions of small-incision surgery would influence their confidence and satisfaction in the outcome of their surgery. We also hypothesized incision length would have no influence on satisfaction once the primary goals of pain relief and functional recovery were realized by the patient.

MATERIALS AND METHODS

Patients' perception of the incision length was obtained with a new patient-perception questionnaire. The questionnaire was filled out by the patient before seeing the surgeon or any of the healthcare workers during the first office visit. The patient then had a consultation with the surgeon and a decision was made to

use a small or long incision in surgery. The decisions were not randomized. When the patient did not voluntarily request small-incision surgery, this decision was made by the surgeon. The responses to the questions then were compiled for patients who had a small incision and these responses were compared with those of patients who had a long incision. Six weeks after the operation, the patients were again queried with the same patient-perception questionnaire to study if their responses to the questions changed after receiving education regarding the operation, having the operation, and experiencing the early recovery period. Once again the responses of the patients with a small incision were compared with those of patients with a long incision. The final comparison was done 6 months to 1 year postoperative. The patients' responses were designed to determine how their healing influenced their perception of the importance of incision size to outcome. Responses of patients with small incisions again were compared with those from patients with long incisions.

One hundred nine patients (131 hips, 22 bilateral) had small-incision surgery and 56 patients (56 hips) had long-incision surgery. In patients who had bilateral THAs performed simultaneously, the patients' responses were considered as one. No patients who had bilateral THAs experienced complications and they did not consider one hip different from the other. During this study, 227 primary THAs in 204 patients were performed by two surgeons. Thirty-nine patients (40 hips) were eliminated: 23 patients (23 hips) were enrolled in a randomized study, 11 (12 hips) lived out of state and did not return for the 6-week postoperative visit, four (four hips) had problems with language, and one (one hip) was younger than 18 years. One hundred percent of the remaining patients were available for followups.

Demographics between groups were similar for age (63.5 ± 12.3 years for patients with short incisions versus 65.6 ± 13.3 years for patients with long incisions), gender (57 women/52 men with short incisions versus 30 women/26 men with long incisions), social function (70 employed/39 retired with short incisions versus 36 employed/20 retired with long incisions), and body mass index (BMI) (26.67 ± 4.3 for patients with short incisions versus 26.4 ± 4.7 for patients with long incisions).

No available self-assessment instrument provided the questions necessary to determine the mental state of patients toward the relationship between their THA and the incisional wound. We developed a patient-perception questionnaire specifically for this study (Appendix). We consulted with a psychologist (MD) regarding the adequacy of the questions. The patient-perception questionnaire was a 14-question survey built around the question: "Do you feel that a patient who has had a small hip incision (2–4 inches long) is more likely to have the following than a patient who has had a traditional incision (10–12 inches long). Patients responded to each question by selecting one of three choices: yes, no, or no difference. The patients were instructed to select the response they believed would most likely produce that outcome (ie, yes meant a small incision would more likely have that outcome than a long incision). We created three domains we believed important: pain (two questions), function (six questions), and perception (attitude) of ability of minimal-incision surgery (MIS) versus traditional-length incisions to create a sense of well-being (six questions).

The Short Form (SF)-36 v2¹⁶ was used for indirect validation of the perception questionnaire. The SF-36 v2¹⁶ is a standard measure for evaluating subjective improvements in patient self-reporting after treatment interventions. We assumed there were no substantial differential characteristics that would influence a patient's response if the scores were not different between the two groups. We compared patients with small and long incisions using the physical component summary and mental component summary to ensure that both groups were compatible for their physical and mental conditions.¹⁵ The SF-36 v2 was administered preoperatively and again at 6 months to 1 year postoperatively, and the scores were computed using the SF Health Outcomes Scoring Software® (Quality Metric, Inc, Lincoln, RI). There were no differences between patients with small or long incisions for the SF-36v2 scores preoperatively and postoperatively for the physical and mental components summaries (Table 1). There were no differential characteristics between the groups that would influence their perception of the incision, and therefore we believe this provided indirect validation for comparison of the groups using the patient-perception questionnaire.¹³

The perioperative experience for the patients was the same. All patients attended a preoperative class and incision lengths were discussed. Patients were told no data were available to determine if one incision was better, and that we were performing a randomized study to explore any differences. Patients who entered the randomized study were not entered in the psychologic study because all patients in the randomized study had long skin incisions (patients with the small incision had a sham skin incision). The patients were educated about pain management and in-hospital and postoperative rehabilitation and recovery. All operations were performed through a posterior approach with small incisions being a mean 9.6 ± 1.5 cm (3.8 inches) and long incisions being a mean 17.9 ± 3.5 cm (7.2 inches). Anesthesia was epidural with sedation. The anesthesia, postoperative pain management, and rehabilitation were described previously.⁵ Postoperative rehabilitation was a walking program and exercises without a physical therapist.

Six months to 1 year postoperatively, one member of the research team (LES) did a followup survey of all patients by telephone. Eight questions were asked with the response choices of yes, no, or no difference (Table 2). These eight questions defined the attitude of the patient toward the operation and incision length at 6 months to 1 year after surgery. The questions focused on the effect of incision length on the patient's confidence in the outcome and the importance of cosmesis.

We used Pearson's chi square test to compare how patients perceived the influence of their incisions with the survey results preoperatively, at 6 weeks postoperatively, and at 6 months to 1 year postoperatively; the same test was used to analyze differences based on gender, diagnosis, and the patient-perception questionnaire survey. Questionnaire and clinical data were analyzed using SPSS software (SPSS Inc, Chicago, IL). A 95% confidence limit was used for each analysis.

RESULTS

The patients' overall preoperative expectations for all 14 questions favored the small incision (Appendix). Preop-

TABLE 1. SF-36® v.2 Scoring Summary

Statistic	Physical Component Score				Mental Component Score			
	Preoperative		Postoperative		Preoperative		Postoperative	
	Short	Long	Short	Long	Short	Long	Short	Long
Mean	36.06	37.76	54.45*	56.24*	52.8	52.44	60.38*	60.74*
SD	7.54	7.16	4.29	3.87	7.79	8.35	3.84	3.42

*Significant difference for postoperative values; SD = standard deviation

eratively, 76% of patients would have more confidence in the success of the operation with a small incision (Question 11), 81% had a more positive mental attitude toward the surgery (Question 12), and 81% thought they would have better overall satisfaction with the results (Question 13) (Appendix). Better satisfaction with small-incision surgery also was expressed by 100% of patients who believed there was better cosmesis with the scar (Question 7), and 96% of patients believed the body was less violated by a small incision (Question 8).

At 6 weeks postoperatively, after patients had been through preoperative education, had surgery, and had experienced 6 weeks of recovery, all believed even more strongly that confidence and satisfaction would be better with a small incision (Table 3). The foundation of the

patients' confidence and attitude was evident in their expectations in the domains of pain and function favoring small-incision surgery that became stronger 6 weeks postoperatively (Table 3). The importance of cosmesis remained at 100%, and all but one patient believed the small incision violated their body less. The patients who had small-incision surgery exceeded their preoperative expectations, as evidenced by the substantially more favorable responses for all 14 questions at 6 weeks postoperatively, whereas the patients with long incisions more strongly favored having a small incision, again as evidenced by the more favorable responses to small incisions at 6 weeks postoperatively.

At 6 months to 1 year postoperatively, 100% of patients believed they had met their goals and had a positive out-

TABLE 2. Followup Survey Questions (6 months to 1 year)

Survey Question	Yes	No	No Difference	p-Value
1. Did the operation meet your goals?				
Short incision (n = 109)	100%			
Long incision (n = 56)	100%			165
2. Do you care now that you had a small incision? (short incision only)				
Short incision	82%	17%	1%	
Long incision	NA			0.000
3. Would you have a long incision?				
Short incision	3.7%	94.5%	1.8%	
*Long incision	25%	39%	35%	0.000
4. Is cosmesis still important?				
Short incision	76%	20%	3.7%	
*Long incision	0%	70%	30%	0.000
5. Are you happy with the cosmesis?				
Short incision	100%	0	0	
*Long incision	39%	38%	23%	0.000
6. Do you have a positive outlook for longevity of your hip replacement?				
Short incision	100%			
Long incision	100%			165
7. Does the incision size affect your outlook for your hip?				
Short incision	85%	4%	11%	
*Long incision	0%	68%	32%	0.000
8. Does the incision size affect your confidence in your hip replacement?				
Short incision	79%	9%	12%	
*Long incision	0%	68%	32%	0.000

*Significantly different responses by the patients with a long incision compared with patients with a short incision

TABLE 3. Statistical Comparison of Preoperative and Postoperative Responses

Parameter	Short Incision (number/percent)	p Value	Long Incision (number/percent)	p Value
Pain				
Less pain in the first days after surgery				
Preoperative	96 88%		34 60%	
Postoperative	107 98%	0.003*	50 90%	0.000*
Ability to walk without pain or discomfort sooner after surgery				
Preoperative	90 91%		54 96%	
Postoperative	109 100%	0.005*	56 100%	248
Function				
Shorter length of time in surgery				
Preoperative	93 85%		42 80%	
Postoperative	109 100%	0.000*	54 96%	0.028
Fewer days in the hospital				
Preoperative	77 71%		45 80%	
Postoperative	108 99%	0.000*	55 98%	0.009
Less muscle tissues being cut during surgery				
Preoperative	97 89%		53 95%	
Postoperative	109 100%	0.000*	56 100%	0.122
The ability to become independent in daily activities sooner				
Preoperative	97 89%		44 79%	
Postoperative	109 100%	0.001*	97%	0.004*
Less of a limp in the affected leg during recovery period				
Preoperative	97 89%		52 92%	
Postoperative	109 100%	0.002*	56 100%	0.042
Quicker healing after surgery				
Preoperative	97 89%		32 57%	
Postoperative	108 99%	0.004*	52 94%	0.000*
Sense of well being				
More confidence in the success of the surgery				
Preoperative	85 78%		41 73%	
Postoperative	105 96%	0.000*	52 94%	0.006
A more positive mental attitude toward the surgery				
Preoperative	91 84%		77%	
Postoperative	105 96%	0.005*	54 96%	0.002*
Better overall satisfaction with the results of surgery				
Preoperative	95 87%		39 70%	
Postoperative	108 99%	0.002*	52 93%	0.002*
Better overall satisfaction with the results of recovery from surgery				
Preoperative	98 90%		44 77%	
Postoperative	105 96%	0.053	53 95%	0.013
A more cosmetic (nice appearance) of scar				
Preoperative	109 100%		56 100%	
Postoperative	109 100%		56 100%	112
The feeling the body is less violated				
Preoperative	103 94%		56 100%	
Postoperative	108 99%	0.059	56 100%	112

Percent = the percent of all patients who answered "yes" that short-incision surgery would be more favorable; *Indicates statistically significant difference between preoperative and postoperative responses

look for longevity of their THAs (Questions 1 and 6) (Table 1). One patient in each group had a complication (one patient fell and experienced a fracture 2 weeks postoperatively which healed, and one patient experienced deep venous thrombosis at 3 months), but neither impacted outcomes. Pain relief and return to function brought a substantial change in the attitude toward incision size for

attainment of primary goals. At 6 weeks postoperatively, 96% of patients with a long incision believed their mental attitude toward the surgery would be better if they had a small incision, whereas at 6 months to 1 year none of these same patients thought the incision affected their outlook (Question 7). Likewise, at 6 weeks postoperatively, 94% of these patients favored small-incision surgery for confi-

dence in the success of their operation, but at 6 months to 1 year none thought the incision size affected confidence about their hip (Question 8).

At 6 months to 1 year postoperatively, 82% of patients who had small-incision surgery considered incision size important in their satisfaction and 100% were happy with the cosmesis (although only 76% thought it still important) (Table 1). Thirty-nine percent of patients with long-incision surgery were not completely satisfied. Twenty-one of 56 patients (38%) who had long-incision surgery were not happy with the cosmesis (Table 1), even though none considered cosmesis important at this time. Twenty-two of 56 (39%) patients who had long-incision surgery would not have that incision again, and 21 of these 22 patients were those who were not happy with the cosmesis. These 22 patients indicated they would not want the long incision again because they were not satisfied with the operation and the reasons for declining a long incision were related to body image (Table 4). Ten of the 11 patients who did not list cosmesis as the primary reason they would decline a long incision stated that they desired a smaller scar. On the 6-month to 1-year survey these 10 patients chose "no difference" in response to the question: "Is cosmesis still important?" Twenty-two of 56 patients who would not want a long incision again included 15 of the 30 women (50%) and seven of the 26 men (26%).

DISCUSSION

Patients do not achieve complete success with an orthopaedic operation unless their primary goals of pain and function are realized and they are satisfied with the outcome.^{3,4,6,10-12} Mancuso et al⁹ reported the highest satisfaction rate was seen in patients expecting psychologic benefit from their THA. Satisfaction requires first that patients achieve their primary goals of pain relief and function,^{10,11} and second, that patients regain their body image by incorporating the reconstructed injured part into their whole body image.³ Patients disassociate an injured part from their body image and experience disunity between

the body and self which is accompanied by an intense conscious awareness of the body.^{3,4} This body image conflict is present in patients having THAs and most likely is the reason they favor less invasive surgery. Restoration of the body image means that the patient no longer separates the body from the self (embodiment or healthy body image⁴). Complete satisfaction first includes the patient's most important clinical outcomes (pain and function) and then incorporation of the repaired hip into the body image so that the patient is not self conscious about it. The hip then recedes into the background of consciousness.³

We note several limitations to our study. Studies such as this are confounded by their subjective nature and the necessity to conduct the study without introducing physician bias. Therefore, we administered the patient-perception questionnaire before there was patient-doctor contact. Similarly, patients were not educated regarding advantages and disadvantages of any incision before they completed the questionnaire. This necessity avoids bias but also prevents randomization of the patients because of the educational requirement of a randomized study. A second limitation of a patient-perception study is the environment of the patient population. Our patients lived in a large metropolitan area in an environment we suspect would be associated with increased emphasis on body image. Thus, the results may not be generalizable to all patient populations. A third limitation is that the surveys used were not formally validated. However, this is not different than all the other orthopaedic studies of patients' psychological assessment that were cited here. The short form (SF-36v2) did allow indirect validation as suggested by the psychiatrist author (PBP). The fourth limitation is that we were fortunate to not have major complications that prevented patients from achieving their goals. One-hundred percent of patients self-assessed that they achieved their goals (Table 1). If a major complication occurred because a small incision was used it likely would cause more dissatisfaction for the patient than the dissatisfaction caused by the use of a long incision.

Our first hypothesis was proved that patients' expectations with a small incision were greater than with a long incision, and preoperatively this affected confidence, positive attitude, and expected satisfaction for greater than 80% of the patients (Appendix). Six weeks postoperatively, the positive attitude toward small incisions was even greater for all patients, and patients with a small incision had clearly exceeded their expectations, which Hudak et al⁴ credit as the most important variable for satisfaction with an orthopaedic operation. By 6 weeks postoperatively, none of the patients of either group had achieved their primary goals, because of the necessary healing time for THA, so it is not surprising that their responses still favored small incisions. Patients with long

TABLE 4. Reasons to Decline Long Incision

Reason	Number of Patients
Cosmesis	11
Quicker recovery	2
Feel old	2
Less worthy	5
Less common	2

Less worthy = patient feels less worthy than a patient with a small incision;

Less common = patient believes the long incision is used less often than a small incision

incisions may have thought that each ache, pain, and limp would have improved if they had short incision surgery, and their anxiety was reflected in their confidence toward their results and recovery. Anxiety is recognized as a negative factor for satisfaction in orthopaedic surgery.¹¹

The second hypothesis was not proved because by 6 months to 1 year, all patients achieved their primary goals of pain relief and functional recovery, but the incision length still had an impact on the third component of satisfaction. It had a positive impact for patients with a small incision, who were 100% satisfied with their cosmesis. Thirty-eight percent of patients with a long incision were not happy with cosmesis, and 39% would not have long-incision THA again. Body image was the singular reason for absence of satisfaction; cosmesis was the prime reason for discontent. We have no data to help identify the patients preoperatively who would be discontent with a long incision, but the discontent was seen in more women than men by nearly 2:1. Women are also more influenced by the halo effect which means the novel attribute of the short incision was judged positively by an already known experience that was objectively irrelevant.¹⁶

Our study did not answer why, preoperatively, patients strongly associate a small incision with satisfaction and a successful operation. The reason may be as simple as "something new is better" and may have been influenced by the media, internet, and social contacts. Mancuso et al⁹ observed that satisfaction with THA is complex and affected by expectations that may come from what patients learned from the media, the Internet, and their social contacts. It also may be explained by the psychologic concept of implicit cognition,² which means the attitude of a patient toward the operation is being influenced subconsciously by a prejudice held from a previous experience. Most patients believed the smaller the injury, the better the consequences. Patients with both short and long incisions seemed to judge the short incision with the halo effect.¹⁶ An example of a previous experience that is irrelevant would be the experience of having a small cut on the arm versus a deep gash and the difference in pain and healing. The patients had no explicit knowledge that small incisions provided for a superior operation because there are no published data supporting superior results.

Patients seemed to want the least violation of their body as reflected by their prejudice toward cosmesis, less muscle injury, less pain, and smaller incisions. Once the patients achieved the primary goals of pain relief and disability, they most often obtained their secondary goal of restoring body image, and incision length became less important. The incision length did seem to contribute substantially to restoration of body image because 100% of patients with a small incision were happy with the cosmesis and most thought the small incision positively affected

their confidence and outlook. This is consistent with the finding of Hudak et al^{3,4} that the appearance of the hand after surgery affected satisfaction with the outcome; the finding of Sharma et al¹³ that the outcome of total knee replacement is related to psychologic and social factors; the finding of Iverson et al⁶ that expectations were associated with all three components of outcome in patients who had surgery for spinal stenosis; and the finding of Mancuso et al⁹ that the appearance of the scar influenced satisfaction.

We suspect if a small incision is important to a patient preoperatively, restoration of their body image would best be achieved by using a small incision. However, social pressures regarding body image may be unique by cities, regions, and countries.¹⁰ The surgeon must make the ultimate decision about the procedure, and if a long incision is preferable it should be performed. The treatment team should be aware of a patient's treatment preferences and try to honor them if possible in the interest of better satisfaction. This is particularly true now that medical and surgical outcomes are assessed in terms of patient satisfaction. If a patient's surgical preference cannot be honored, additional time should be spent educating him or her regarding the reasons necessitating the surgeon's choice. A patient who feels part of medical decision-making will more than likely take responsibility for the outcome. Therefore, the importance of the incision length on the outcome must be determined individually by the surgeon according to his or her skills, patient population, and the environment in the patient's city or country.

Acknowledgment

We thank Marie Dolloway for advice in developing the initial 14-question survey.

References

1. Brewer BW, Van Raalte JL, Cornelius AE, Petitpas AJ, Sklar JH, Pohlman MH, Crushell RJ, Ditmar TD. Psychological factors, rehabilitation adherence, and rehabilitation outcome after anterior cruciate ligament reconstruction. *Rehabil Psychol.* 2000;45:20-37.
2. Greenwald AG, Mahzarin BR. Implicit social cognition: attitudes, self esteem and stereotypes. *Psychol Rev.* 1995;102:4-27.
3. Hudak PL, Hogg-Johnson S, Bombardier C, McKeever PD, Wright JG. Testing a new theory of patient satisfaction with treatment outcome. *Med Care.* 2004;42:726-739.
4. Hudak PL, McKeever PD, Wright JG. Understanding the meaning of satisfaction with treatment outcome. *Med Care.* 2004;42:718-725.
5. Inaba Y, Dorr LD, Wan Z, Sirianni L, Boutary M. Operative and patient care techniques for posterior mini-incision total hip arthroplasty. *Clin Orthop Relat Res.* 2005;441:104-114.
6. Iverson MD, Daltroy LH, Fossel AH, Katz JN. The prognostic importance of patient preoperative expectations of surgery for lumbar spinal stenosis. *Patient Educ Couns.* 1998;34:169-178.
7. Ogonda L, Wilson R, Archbold P, Lawlor M, Humphreys P, O'Brien S, Beverland D. A minimal-incision technique in total hip arthroplasty does not improve early postoperative outcomes: a prospective, randomized controlled trial. *J Bone Joint Surg Am.* 2005; 87:701-710.

8. Mahomed NN, Laing MH, Cook EF, Daltroy LH, Fortin PR, Fossel AH, Katz JN. The importance of patient expectations in predicting functional outcomes after total joint arthroplasty. *J Rheumatol*. 2002;29:1273-1279.
9. Mancuso CA, Salvati EA, Johanson NA, Peterson MGE, Charlson ME. Patients' expectations and satisfaction with total hip arthroplasty. *J Arthroplasty*. 1997;12:387-396.
10. Prayer L. *Medicines and Culture*. New York, NY: Henry Holt and Company, LLC; 1996.
11. Rosenberger PH, Jokl P, Ickovics J. Psychosocial factors and surgical outcomes: an evidence-based literature review. *J Am Acad Orthop Surg*. 2006;14:397-405.
12. Sculco TP. Minimally invasive total hip arthroplasty: in the affirmative. *J Arthroplasty*. 2004;19:78-80.
13. Sharma L, Sinicore J, Daughtery C, Kuesis DT, Stulberg SD, Lewis M, Baumann G, Chang RW. Prognostic factors for functional outcome of total knee replacement: a prospective study. *J Gerontol A Biol Sci Med Sci*. 1996;51:M152-M157.
14. Thorndike EL. A constant error in psychological ratings. *J Appl Psychol*. 1920;4:12-29.
15. Ware JE, Kosinski M, Dewey JE. *How to Score Version 2 of the SF-36® Health Survey*. Lincoln, RI: Quality Metric Incorporated; 2000:23-26.
16. Ware JE Jr, Sherbourne CD. The MOS 36-item short-form health survey (SF-36). I. Conceptual framework and item selection. *Med Care*. 1992;30:473-483.

APPENDIX

Preoperative Responses by All Patients

Do you feel that a patient who has had a small hip incision (2-4 inches long) is more likely to have the following than one who has had a traditional incision (10-12 inches)?

These responses are in percentages of the 188 patients.

Yes No Difference No

- +1. A shorter length of time in surgery 84 12 4
- +2. Fewer days in the hospital 73 19 7
- +3. Less muscle tissues being cut during surgery 91 9 0
- *4. Less pain in the first days after surgery 79 21 0
- +5. Quicker healing after surgery 78 21 1
- *6. The ability to walk without pain or 93 6 1 discomfort sooner after surgery
7. A more cosmetic (nice appearance) of scar 100 0 0
8. The feeling the body is less violated 96 3 0
- +9. The ability to become independent in daily activities sooner 85.4 13.9 0.6
- +10. Less of a limp in the affected leg during recovery period 90 8 2
11. More confidence in the success of the surgery 76 21 3
12. A more positive mental attitude toward the surgery 81 16 3
13. Better overall satisfaction with the results of surgery 81 17 2
14. Better overall satisfaction with the results of recovery from surgery 86 14 0

+Designates a question that was included in the domain of function; *Designates a question that was included in the domain of pain; No symbol designates a question that was included in the domain of attitude or sense of well being