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# Positive Effect of Patient Education for Hip Surgery

## *A Randomized Trial*

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**The current trial compared patient education before total hip arthroplasty with the usual verbal information. A randomized, controlled 24-month prospective single-center study was done. Patients scheduled for a first elective total hip arthroplasty for primary hip osteoarthritis were enrolled. All patients were given the usual information and an information leaflet and completed a self-evaluation questionnaire (Spielberger State and Trait Anxiety Inventory). The patients were assigned randomly to two groups: Group 1 attended a collective multidisciplinary information session 2 to 6 weeks before surgery and the control group did not attend. All patients completed another State Anxiety Inventory just before surgery and then 1 and 7 days after surgery. One hundred patients were randomized. Forty-eight attended the collective information session. Patients receiving education were significantly less anxious just before surgery than patients in the control group, in linear regression after adjustment for gender, trait and state anxiety at baseline, depression score, and health assessment questionnaire score. They experienced less pain before surgery and were able to stand sooner. However, the trend toward lower anxiety scores was not statistically significant after surgery. Patient education decreases preoperative anxiety and pain in patients having hip surgery.**

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Information is provided to patients before surgery for several reasons. First, it provides a mechanism by which patients can consent to and participate in the treatment decision, enabling them to understand the factors relevant to the care proposed. Second, it reduces preoperative anxiety,[1,2,3,9] and finally, it improves postoperative recovery.[4,11]

Several approaches can be used: (1) usual information is provided verbally by the surgeon and the anesthetist as a component of informed consent; (2) leaflets have been proposed but it has been suggested that many patients do not read or fully understand them;

(3) videos or audiocassettes may provide better compliance, but this approach does not allow discussion and interactivity, so misunderstandings may not be clarified; (4) collective multidisciplinary information sessions in which doctors provide information to a small group of patients provide the possibility of interactive discussion.[6] It is thought by some that providing extra information, particularly about risks and complications, may cause patients undue anxiety.[5,10,18] There is also evidence that the opposite may be true.[1,3,12]

The current trial compared the impact of a collective multidisciplinary standardized information session with that of the usual verbal information on preoperative and postoperative anxiety of patients scheduled to have a total hip arthroplasty.

## MATERIALS AND METHODS

### Study Design

A randomized single-center controlled trial was done in a teaching hospital in Paris.

### Participants

Between September 1997 and December 1999, consecutive patients scheduled for total hip arthroplasty were considered for enrollment in the trial. The inclusion criterion for randomization was a first elective total hip arthroplasty for primary hip osteoarthritis.

Exclusion criteria were: secondary osteoarthritis or another disease of the hip, age older than 80 years, an American Society of Anesthesiologists (ASA) physical status greater than 2 (Classification system according to the American Society of Anesthesiologists: 1 = a normal healthy patient, 2 = a patient with mild systemic disease, 3 = a patient with severe systemic disease, 4 = a patient with a severe systemic disease that is constant threat to life, 5 = a patient who is moribund and not expected to survive without the operation, and 6 = a patient declared brain-dead whose organs are being removed for donor purposes),[19] a Montgomery and Aasberg Depression Rating scale[13] greater than 30 (it seemed important to select an homogeneous group of patients with the same disease, and the same physical and mental status), an inability to understand French, sight impairment, and living far from Paris. Patients were screened after surgical consultation and before their appointment with the anesthetist, approximately 8 weeks before surgery. Informed consent for participation in the trial was obtained and the trial was approved by the ethics committee of the authors' institution.

### Assignment

Patients were assigned randomly to two groups: a multidisciplinary collective information group that received verbal information and an information leaflet (intervention group) or a control group that received verbal information and an information leaflet.

The allocation sequence was generated by the random placement of thoroughly shuffled marked cards into sequentially numbered sealed, opaque envelopes by the outpatient clinic assistant involved in the trial.

### Intervention

Patients in the intervention group attended an education session 2 to 6 weeks before surgery. They were invited to bring a spouse, relative, or significant other. The small number of patients (three to six patients per session) made it possible to devote more attention to the questions of each patient and establish a relationship of trust. The program of the collective multidisciplinary information session was standardized (Appendix 1). The program lasted half a day with the same overhead transparencies used for all patients; however, the multidisciplinary team varied: it consisted in each case of one surgeon and one anesthetist, but two surgeons and three anesthetists fulfilled these roles in rotation. The team answered all the questions of the patients and discussed the intervention with them. Patients also received the usual verbal information and standard information leaflet. The leaflet was proposed as a means of reinforcing the traditional verbal information.

The control group (usual procedure) received only the usual verbal information from the surgeon and the anesthetist and the standard information leaflet. Verbal information was individual and based on patients' personality, psychology, expectations, and needs (some patients will actively seek more information, whereas others will avoid information). The leaflet was prepared by the team. One part contained practical information concerning hospitalization and another part provided advice and warnings about rehabilitation and life with the prosthesis.

## Measures

### *Baseline Measures*

Demographic data (gender, age, disease duration), and type of blood transfusion (autologous or not autologous) were collected. A self-evaluation functional score, health assessment questionnaire (20 questions),[7] and the Montgomery and Aasberg Depression Rating Scale,[13] also were determined. In addition, each patient completed the Spielberger anxiety self-evaluation questionnaire (State-Trait Anxiety Inventory). The State-Trait Anxiety Inventory is an instrument for measuring anxiety in adults.[17] This questionnaire is designed to assess an individual's momentary or situation-associated anxiety. The French validated translation of the questionnaire was used.[16] The State-Trait Anxiety Inventory consists of 40 items and has two parts: the state scale and the trait scale. The Trait Anxiety Inventory reflects how people generally feel all the time. The State Anxiety Inventory assesses feelings of apprehension, tension, nervousness, and worry in terms of how respondents feel right now. Possible scores range from 0 to 80, with a score of 20 indicating low anxiety and a score of 80 indicating high anxiety.

## Main Outcome Measure

The State Anxiety Inventory was administered the day before surgery and postoperatively (1 day and 7 days after surgery). The patients completed a self-evaluation questionnaire about their use of analgesic drugs (personal analgesic use diary). The day on which the patients were permitted to stand was the same for all patients (Day 2 after surgery). However, the day the patient was permitted to walk depended on the patient's pain, asthenia, anemia, anxiety, or contraindications related to the doctor's orders. Rehabilitation and length of hospital stay were recorded and a patient satisfaction score was determined (range, 0%–100%).

## Statistical Analysis

It has been suggested that a change in the State-Trait Anxiety Inventory score of as little as 5 points may be clinically relevant.[10] To detect such a change with 95% power (assuming a standard deviation of 8) the required sample size was calculated to be 50 patients in each group (Type 1 error = 0.05).

The changes in anxiety scores with time were calculated for each patient by subtracting the results at baseline from those at followup. Data were reported as mean percentages ± standard deviation. The main variables of interest (anxiety scores, day the patient could stand), followed a reasonably normal distribution. Therefore, parametric statistical methods were used to assess relationships between variables: t test (two groups and pairwise test) and chi square tests. The difference between the two groups in change in scores was calculated with 95% confidence intervals. The conventional level 0.05 was used for the first type error ($\alpha$).

The differences between the groups with time were analyzed statistically using a multiple regression model to adjust for several baseline characteristics and to account for the effect of regression toward the mean. Multiple regression models also were used to compare groups for analgesic treatment, day on which the patient stood, and discharge.

The analysis was done on an intention to treat basis.

# RESULTS

One hundred of the 201 patients initially screened were enrolled in the trial. Twenty-five patients declined participation (professional activities, participation in a study, or no need for further information) and 76 patients were excluded from the trial (exclusion criteria).

Forty-eight patients were assigned to the information leaflet plus collective multidisciplinary information session Group 1 and 52 patients were assigned to the usual verbal information plus information leaflet group (control Group) (Fig 1). All but one patient (control group) completed the trial. This patient withdrew from the study refusing to complete the State Anxiety Inventory after surgery (a preoperative State Anxiety Inventory score was obtained).

## Characteristics of Patients

The characteristics of the patients are shown in Table 1. Despite randomization, there were differences between the groups with respect to gender (there were more women in the control group), baseline Trait Anxiety Inventory, and depression score (patients in the intervention group initially were more anxious and depressed).

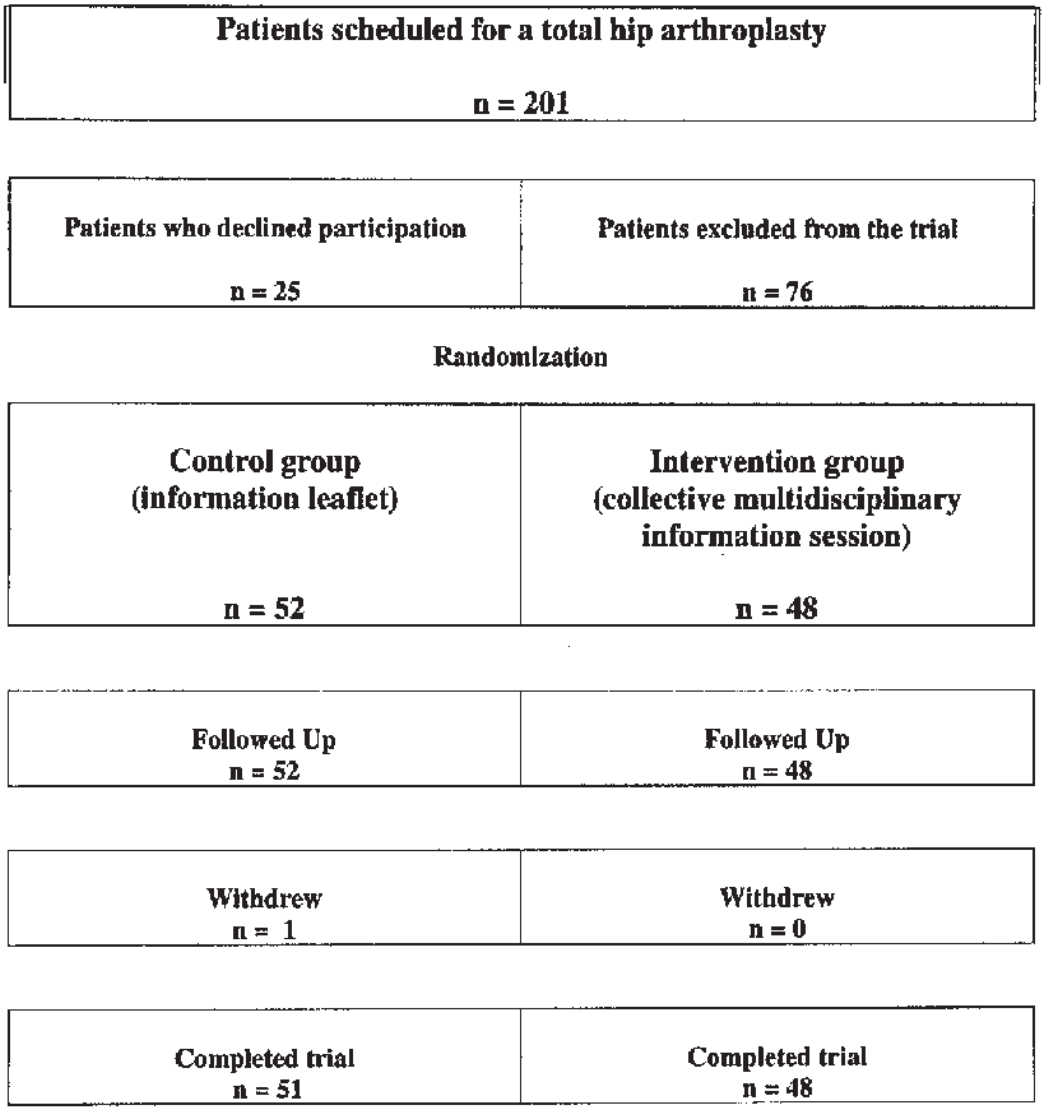


**Fig 1.** This figure shows the study design: screening, selection, distribution of the patients in the two different groups, and followup.

## Outcome Results

*Anxiety*

The differences in anxiety scores at each point during followup are shown in Table 2. The difference between groups was in favor of the intervention group but was not statistically significant in univariate analysis: $p = 0.08$, difference $= -3.56$; 95% confidence level, $-7.56$ to $+0.45$. In multivariate analysis adjusted for gender, initial trait and state anxiety scores, depression score, health assessment questionnaire score, and autologous blood

**TABLE 1. Characteristics of Participants at Baseline**

| Characteristics of Patients | Interventional Group (n = 48) | Control Group (n = 52) | p Value* |
|---|---|---|---|
| Age at surgery (years) − (mean ± standard deviation) | 62.7 (8.8) | 64.3 (9.5) | 0.37 |
| Gender | | | |
| Male (n, %) | 24 (50) | 20 (38) | 0.31 |
| Female (n, %) | 24 (50) | 32 (62) | |
| Height (m) − (mean ± standard deviation) | 165.7 (17.4) | 166.8 (10.0) | 0.72 |
| Weight (kg) − (mean ± standard deviation) | 73.5 (13.7) | 71.7 (14.1) | 0.51 |
| Progression of osteoarthritis (months) − (mean ± standard deviation) | 68.9 (85.7) | 59.5 (91.4) | 0.59 |
| Previous surgery (n, %) | 3 (6) | 4 (7) | 1.00 |
| Side | | | |
| Right (n, %) | 25 (52) | 24 (46) | 0.68 |
| Left (n, %) | 23 (48) | 28 (54) | |
| Depression score at enrollment (mean ± standard deviation) | 6.7 (5.6) | 4.5 (3.4) | 0.02 |
| Health assessment questionnaire score (mean ± standard deviation) | 0.77 (0.46) | 0.83 (0.37) | 0.38 |
| Autologous blood transfusion, (n, %) | 41 (85) | 42 (81) | 0.60 |
| Trait anxiety inventory score (mean ± standard deviation) | 43.2 (8.6) | 38.5 (8.1) | 0.006 |
| State anxiety inventory score (mean ± standard deviation) | 39.6 (11.0) | 36.7 (11.0) | 0.21 |

*t test or chi square test

transfusion, there was a significant difference between groups: the patients in the intervention group were significantly less anxious just before surgery than the patients in the control group (−4.98; 95% confidence interval, −8.62 to −1.34; p = 0.01). However, the trend toward lower anxiety scores was not statistically significant after surgery.

*Other Outcomes*

The difference in presurgery pain (visual analog scale) between groups was statistically

**TABLE 2. Outcome Results**

| Outcome Results | Interventional Group (n = 48) | Control Group (n = 52) | p Value* |
|---|---|---|---|
| Pain (visual analog scale) − (mean ± standard deviation) | | | |
| Before surgery | 24 (21) | 35 (29) | 0.04 |
| After surgery | 21 (18) | 28 (22) | 0.07 |
| State anxiety inventory score—differences from baseline (mean ± standard deviation) | | | |
| Before surgery | −1.74 (9.6) | +1.81 (9.6) | 0.08 |
| After surgery | −2.65 (10.77) | +0.63 (12.39) | 0.18 |
| Discharge | −4.16 (10.74) | −2.53 (11.98) | 0.51 |
| Complications (n, %) | 9 (18) | 6 (12) | 0.40 |
| Treatment | | | |
| Morphine (n, %) | 4 (8) | 5 (9) | 1.0 |
| Psychotropes (n, %) | 15 (31) | 13 (25) | 0.49 |
| Standing (days) − (mean ± standard deviation) | 2.6 (0.6) | 2.8 (1.0) | 0.43 |
| Discharge (days) − (mean ± standard deviation) | 8.1 (2.5) | 7.9 (2.4) | 0.71 |
| Patient satisfaction (%) − (mean ± standard deviation) | 91.6 (16.0) | 90.6 (22.3) | 0.81 |

*t test or chi square test

significant in univariate analysis (Table 2): the mean presurgery pain score was 24 ± 21 for the patients in the intervention group and 35 ± 29 for the patients in the control group ($p = 0.04$), and the mean pain score after surgery was 21 ± 18 for the patients in the intervention group and 28 ± 22 for the patients in the control group ($p = 0.07$). In multivariate analysis (linear regression model), adjusting for gender, baseline trait and state anxiety, depression score, health assessment questionnaire score, and autologous blood transfusion, there was a significant difference between groups: the patients in the intervention group experienced significantly less pain before surgery (−14; 95% confidence interval, −26 to −2; $p = 0.02$) and after surgery (−10; 95% confidence level, −20 to −1; $p = 0.04$).

The patients in the intervention group also stood sooner (−0.35; 95% confidence interval, −0.72 to +0.02; $p = 0.07$) after adjustment for gender, baseline trait and state anxiety, depression score, health assessment questionnaire score, and autologous blood transfusion.

## DISCUSSION

The current study showed that a collective multidisciplinary information session 2 to 6 weeks before surgery may decrease pain before surgery and prevent an increase in anxiety before total hip arthroplasty.

In this study, attending an education program prepared the patients for the surgical procedure. They had a better idea of what to expect, met the team members, and had an interactive discussion with the team members. The patients also felt less pain, perhaps because they were less stressed and better prepared to cope with pain. Anxiety has been reported to increase sensitivity to pain and to reduce anxiety decreases complaints of pain.[14] The patients also stood sooner, probably because of greater motivation: they understood the importance of walking soon after surgery and wanted to progress rapidly.

In previous studies, mostly done by anesthetists, numerous methods for controlling pain and anxiety have been proposed[14]: preparatory information,[8] cognitive coping skills or strategies, preparatory information, and some form of coping skill instruction or training,[3,4] multifaceted cognitive behavioral treatment regimens, and stress-inoculation training.[2] It has been shown that a full information leaflet increases the patient's knowledge[11] but with mixed results for anxiety: greater knowledge may decrease fear of the unknown, reduce presurgery anxiety, and improve recovery after surgery,[15] or it may have no impact on presurgery anxiety.[5] Written information is effective in only a proportion of patients because it requires at least basic literacy and motivation to read the leaflet. Visual information provided by video has been shown to have a positive effect on anxiety and knowledge[12] of patients before having colonoscopy and preoperative anxiety has been shown to be reduced by supplying additional anesthesia information in printed and video format.[1]

Several aspects of this information program may have contributed to its success: the homogeneous group of patients (severe inclusion criteria) and the long preparation of the standardized program. Such a program cannot be proposed for everybody (collective session, duration of the session). The excluded patients probably would have been more likely to benefit from this education program (bad physical status or bad health mental status with a high level of anxiety and many questions). Before proposing this collective multidisciplinary information session, a group of patients were interviewed to identify the questions to develop. In addition, a large staff from various disciplines was brought together to discuss and write the final overhead transparencies, which then were tested before use with the study patients. Three anesthetists and two surgeons highly involved in education took part in the sessions with the other members of the multidisciplinary team (rheumatologist, physiotherapist, psychiatrist). Their cooperation and availability increased patient confidence and motivation, and provided the small number of patients selected to attend the session (person-

alized information for no more than six patients at each session), with the possibility of asking questions (the program tried to demystify joint replacement surgery by answering as many questions as possible).

However, it is difficult to know which part of this multicomponent program was the most useful for the patient and the most important for reducing anxiety (intervention of surgeon, anesthetist, rheumatologist, physiotherapist, psychiatrist) and to determine the optimal size of patient groups.

The program did not affect complications after surgery, analgesic treatments, or time of discharge. These results are not consistent with those of previous studies, showing an improvement in postoperative recovery[11] or a reduction in costs with a decrease in the length of hospital stay.[15] This lack of difference may be partly attributable to the length of stay already being very short for all patients at the orthopaedic unit, and partly attributable to the postoperative period which is different in terms of patient psychology and expectations. It also may be attributable to the absence of coping or behavioral strategies in the information program.

The current study has limitations. The study was unblinded but outcome criteria were assessed by patients by means of self-evaluation questionnaires. Moreover, despite randomization, there were differences between the groups in gender, baseline trait anxiety inventory score, and depression score. However, the differences between the groups regarding the outcome criteria cannot be explained by an imbalance in sociodemographic characteristics as multivariate analysis, controlling for all potentially confounding variables, left the estimation and probability value unchanged. Finally, the samples had limited size and the differences observed were just below the level of statistical significance.

The current study showed the value of developing alternative information approaches for informing patients and answering their questions. Group discussion with the care team seems to be useful. Optimization of collective multidisciplinary information sessions, with the participation of a patient representative who has had joint replacement surgery, and a personalized interview with a nurse responsible for patient information might improve the quality of postoperative care.

Additional research is required to conform the effect of this type of interactive multidisciplinary collective approach, in particular medium- and long-term evaluations (patient adherence to rehabilitation, infection or luxation prevention, long-term effect on the outcome of total hip arthroplasty, and quality of life with a prosthesis) and cost-effectiveness studies should be done.

## APPENDIX 1 - THE EDUCATIONAL SESSION

### 1-Osteoarthritis of the hip: Rheumatologist's part (half an hour).

- Presentation of the team
- Normal anatomy of the hip and osteoarthritis of the hip
- Explanation of the disease, risk factors, disease process, and its consequences
- Principle and benefit of total hip arthroplasty
- Duration of hospitalization, sequence of events associated with hospitalization
- Practical details concerning hospitalization (telephone numbers, furniture, contention, socks, crutches, discharge arrangements, what to bring to the hospital)
- Patient's questions

### 2-Surgery: Orthopaedic surgeon's part (half an hour).

- Surgical replacement procedure: prosthesis used, technique (trochanteric osteotomy), and demonstration of materials, radiographs
- Duration of the surgery
- Potential complications and risks of the surgery (dying, dislocation, infection, nerve injury, loosening, heterotopic ossification) and prevention
- Scar, wound precautions

Time that it takes before the hip surgery ceases to be the focus of the patient's life
The importance of regular followup with the surgeon (loosening and wear)
Protection against infection
Patient's questions

**3-Anesthesia: Anesthetist's part (half an hour).**

Preparation for anesthesia (autologous blood transfusion, laboratory tests, cardiac preparation, avoiding drugs)
Preanesthesia visit, postoperative course, and monitoring equipment
Postanesthesia care unit
The anesthetic procedure: type of anesthesia, anesthetic drugs, duration, loss of control
Potential complications and risks (dying, cardiac, pulmonary, brain injuries, bleeding, pain)
Postoperative pain control
Unpleasant side-effects (bedrest, sleeping difficulties, nausea, suction, bladder catheter)
Deep vein thrombosis prevention
Postoperative drugs (pain medication, nonsteroidal antiinflammatory drugs, anticoagulation therapy, precautions)
Nutrition and blood sample
Patient's questions

**4-Rehabilitation: Physiotherapist's part (half an hour).**

Rehabilitation procedure (bedrest, sitting up, exercises, beginning to walk, walker, dangerous movements, stair climbing)
Rehabilitation period (going home or to a specific center: necessity, duration, physiotherapy)
The role of social workers
Bathing, driving, sports participation
Sexual activities
Patient's questions

**5-Patients' questions: Psychiatrist's and rheumatologist's part.**

Discussion with the patients: personal patient wait, physical and emotional preparation, benefits of total hip arthroplasty, personal or collective problems, long-term precautions

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