

Osteoarthritis and Cartilage



Fulfilment of patient-rated expectations predicts the outcome of surgery for femoroacetabular impingement

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SUMMARY

Objective: The aim of this study was to explore the role of expectations in relation to patient-rated global treatment outcome in patients undergoing hip preservation surgery for femoroacetabular impingement (FAI).

Method: Pre-operatively, 86 patients completed the Oxford Hip Score (OHS), a question about the motivation for undergoing surgery, and Likert-scales rating the improvement expected in various domains (pain, general function, sport, walking capacity, independence, social function, mental well-being). 12-months post-operatively, they rated the actual perceived improvement in each domain and the global outcome of surgery (GTO, 5-point Likert-scale: operation “helped a lot” through to “made things worse”), and completed the OHS again.

Results: The most frequent “top reason” for surgery was “alleviation of pain”, being indicated by 33% patients; 20% patients chose “fear of worsening”, 16% “improvement in everyday activities”, 11% “other therapies failed”, 10% “improvement in sporting activities” and 10% other. The 12-month data revealed prior expectations had been overly optimistic in more than 50% patients for hip pain, sport, and general physical capacity, and in 33–45% patients for independence, mental well-being, and walking capacity. Multiple regression revealed significant ($P < 0.05$) unique associations between GTO and “fulfilled expectations” for pain and sport (explaining 47% and 12% variance, respectively).

Conclusion: Expectations of surgery were overly optimistic. Having one’s expectations fulfilled, especially in relation to pain, was important for a good outcome. The results emphasise the benefit of assessing patient-orientated outcome in routine practice and the factors that might influence it, such that realistic expectations can be established for patients prior to surgery.

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Introduction

Hip preservation surgery is applied as a treatment for femoroacetabular impingement (FAI), a relatively recently characterised phenomenon associated with hip pain and dysfunction in young (particularly active) adults^{1,2}. In this population, total hip replacement is not an option and should be avoided or delayed. The aims of joint preserving surgery are to create impingement-free motion to alleviate symptoms and, simultaneously, to restore a more normal

morphology to prevent or delay the progression of irreversible degenerative changes of the hip joint^{1,2}. Whether the latter goal is achieved can only be evaluated using very long-term trials; however, since one of the main reasons for medical consultation – and hence an important and more “immediate” goal of the surgery – typically concerns the relief of pain and improvement of function, the fulfilment of expectations in relation to these aspects of the treatment is important to investigate. Pre-operatively, the patient is made aware of the twofold goal of surgery, and informed that, while it may not result in complete symptom relief, it ought to provide long-term benefit in terms of preserving the joint and delaying or preventing the development of osteoarthritis. This information is important for managing the patient’s expectations in relation to the various outcomes of surgery.

Numerous studies have shown that patients’ expectations of treatment are an important determinant of their subsequent

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assessment of whether the treatment helped. Different theoretical models exist describing the relationship between expectations and satisfaction, with the most dominant being based on the notion of “expectations being met”, i.e., minimising the mismatch between prior expectations and the actual result^{3,4}. Others, in contrast, maintain that higher expectations *per se* are associated with better outcomes^{5–9}, perhaps reflecting the influence of dispositional optimism¹⁰ or a sort of placebo effect. Others, still, suggest that the actual post-treatment status with regards to symptoms or function more strongly governs whether the patient is happy with the result, regardless of prior expectations^{11–13}.

A number of studies have examined patient expectations in relation to hip arthroplasty^{4,7,8,13–22}. Collectively, these have shown that patients’ expectations are often overly optimistic, that 13–40% expectations go unfulfilled, and that pre-operative expectations or their fulfilment are associated (to varying degrees) with treatment satisfaction. To the authors’ knowledge, no studies have been carried out to date investigating patients’ expectations in relation to hip preservation surgery.

This prospective study seeks to explore the role of expectations in relation to patient-rated global treatment outcome in patients undergoing joint preservation surgery (minimally-invasive open or arthroscopic) for FAI. Specifically, using multiple regression analysis, and taking account of any potential confounders, we tested which (if any) of the following variables made a unique significant contribution to explaining the variance in the patients’ rating of “how much the operation helped” 12 months after surgery: 1) baseline expectations, 2) the actual hip status (pain/function) at 12-months follow-up and 3) expectations being fulfilled. We hypothesised that the most important statistical determinant of outcome would be the fulfilment of expectations.

Method

Overview of the study

One-hundred and eighty-five consecutive patients (96 (52%) men and 89 (48%) women) undergoing either arthroscopic surgery with labral preservation (surgeon 1) or limited antero-lateral open surgery with labral resection (surgeon 2) for FAI in our hospital between July 2008 and April 2010 were eligible for participation in the study. Inclusion criteria included: cam, localised pincer, or mild–moderate mixed impingement in hips with at most early-osteoarthritis (\leq Tonnis grade 1); arthroscopic or mini-open osteochondroplasty as the foreseen surgical intervention; and a good understanding of written German. Exclusion criteria included: symptomatic hip dysplasia (lateral centre edge angle (LCE) $< 20^\circ$ measured on the AP view); combined FAI with a global over-coverage and extra-articular impingement; and hips requiring cartilage repair techniques (for these, the post-operative restrictions and rehabilitation were more extensive compared with the included surgical techniques). The operations were performed by two senior hip surgeons with considerable experience in joint preserving surgery who were beyond their initial learning curves.

One to three weeks before admission for surgery, patients were sent a questionnaire, by post, accompanied by a letter explaining the aims of the study, an invitation to participate, and an informed consent form. They were requested to complete the questionnaire and bring it with them on the day of admission. After 12 months, a second questionnaire was sent out by post to those that had returned a pre-operative questionnaire and had not undergone any surgery on the spine or lower extremities in the preceding 4 months, with the request to complete it and return it using the stamped addressed envelope enclosed. The study was approved by

the local ethical committee and all patients gave their written informed consent to participate.

Questionnaires

In addition to questions about demographics and medical history, the questionnaire booklet contained the following questions related to expectations.

Reasons for surgery

The patients were asked to give their three most important reasons for deciding to undergo surgery, selected from the following list: other therapies hadn’t helped, fear of a worsening of my current situation, to retain my independence, improvement in performance of everyday activities, improvement in ability to do sport, improvement in walking capacity, pain reduction, recommended by my doctor, other.

Expectations of surgery

Expectations of surgery were assessed using a modified version of a questionnaire previously used and validated for patients undergoing spine surgery²³, based on the expectations scale of the North American Spine Society (NASS) Lumbar Spine Questionnaire²⁴. The question, “*what changes in the following items do you expect to experience as a result of the operation? (not your hopes and wishes, but realistic expectations!)*” was asked in relation to each of eight items: hip pain, walking capacity, independence in everyday activities, ability to do sport, general physical capacity (at home and work), frequency and quality of social contacts, mental well-being. The five response options were: much better (0), better (1), somewhat better (2), unchanged (3), worse (4); the patients also had the option “I don’t know”.

Fulfilment of expectations

At follow-up, using a parallel question to that of the pre-operative expectations questionnaire, patients were asked, “*what changes in the following items have occurred as a result of the operation?*”, in relation to the same seven items presented in the expectations questionnaire (see above). The same five response options were presented (much better (0) through to worse (4)). In this way, the difference between the pre-op “expectation score” (from 0 to 4) and the follow-up “actuality score” (from 0 to 4) yielded a measure of the extent to which expectations had been exceeded, met, or not met for each item (possible range for “expectations met” score, -4 to $+4$).

Global treatment outcome

At 12-months’ follow-up, the patients rated the global treatment outcome (GTO) on a 5-point Likert-scale (the hip operation: helped a lot, helped, helped only little, didn’t help, made things worse). This transition question has been used extensively in assessing the outcome of other types of orthopaedic surgery²⁵, and more recently its validity has also been demonstrated in patients with FAI²⁶.

Hip pain/function

Before and 12 months after surgery, patients completed the Oxford Hip Score (OHS). The OHS consists of 12 questions asking patients to describe their hip pain and function during the past 4 weeks²⁷. Each question has responses on an adjectival scale with values from 0 to 4. An overall score is created by summing the responses to each of the 12 questions. The total score can range from 0 to 48 (most recent scoring system), where 0 is the worst possible score indicating severe hip symptoms and 48 is the best score suggesting excellent joint function.

Statistics

Univariate analyses (Spearman rank correlation, Chi-square tests, linear regression or analysis of variance, as appropriate) were used to explore the associations between various baseline variables (age, gender, comorbidity, educational level, baseline OHS) and GTO, in order to determine whether any of these ought to be controlled for in the later multivariate analyses. Similarly, univariate analyses of the correlation between GTO and each potential predictor (the seven expectations items, OHS score at 12 months, and the fulfilment of expectations (“expectations minus actuality”) scores for each of the seven items) were carried out to guide variable selection for the multiple regression (all variables with $P < 0.10$ were considered for inclusion).

Multiple regression analyses (using a forward conditional selection for entry of variables, based on a probability-of- F -to-enter ≤ 0.05) were carried out to identify the independent variables that made a significant unique contribution to explaining the variance in the dependent variable, GTO at 12 months. The presence of collinearity was excluded by examining the tolerance values and variance inflation values for the independent variables in the final regression model; values < 0.1 and > 5 , respectively, were considered to suggest problematic collinearity²⁸.

Statistical analyses were carried out using Statview 5.0 (SAS Institute Inc, San Francisco, CA, USA) and SPSS v16.0 for Apple Macintosh (Chicago, IL, USA).

Statistical significance was accepted at the $P < 0.05$ level.

Results

Participants

One-hundred and seventy one patients (91%) underwent the planned surgery, 128 (75%) of which volunteered to complete the pre-operative questionnaire. 86 (67%) of these also completed a 12-month follow-up questionnaire. Given the relatively low response rate, the OHS values of those who did not respond at 12 months, but had responded at other time points, were compared with the scores of those who responded at 12 months. A total of 78% and 51% of non-respondents had completed 6-week and 6-month questionnaires, respectively, as part of the hospital's routine quality control assessment. The OHS scores were comparable at all time points (12-month non-respondents vs 12-month respondents: baseline, 33.0 ± 7.3 vs 32.0 ± 9.1 ; 6 weeks, 27.6 ± 7.7 vs 30.1 ± 8.5 ; and 6 months, 38.9 ± 7.3 vs 37.9 ± 7.2 ; $0.125 < P < 0.567$). In addition, we tried to contact all the 12-month non-respondents by phone. Altogether, 21 (51%) were reached. Of these, 48% said that they had simply forgotten about it, but that they intended sending the questionnaire back (but never did); 19% declared that they had no time and/or the questionnaire was too long and so they did not want to complete it; 19% declared that, in the meantime, they had undergone surgery on other joints and this made completion of the questionnaire difficult; and three (14%) declared that their current status was not good and they were dissatisfied (and therefore did not want to cooperate with us). Comparing the patients that completed the 12-month questionnaire with those that did not and also could not be reached by phone, the OHS values were similar at all time points: baseline, 33.0 ± 7.4 vs 33.2 ± 9.7 ; 6 weeks, 27.6 ± 7.7 vs 29.2 ± 8.0 ; 6 months, 38.9 ± 7.3 vs 37.7 ± 5.8 , respectively; $0.420 < P < 0.938$. The medical history and sociodemographic characteristics of the patients are shown in Table I. No differences were found between respondents and non-respondents, or between male and female patients (data not shown) for clinical and socio-demographic factors. Collectively, these results suggest that major selection bias did not occur and that data were missing at random.

Table I

Sociodemographic and medical history characteristics of the patients

	Baseline	12-Month follow-up		P value
	All patients	Non-respondents	Respondents	
Number (%)	128 (100%)	42 (33%)	86 (67%)	
Mini-open	30%	20%	35%	0.13
Arthroscopy	70%	80%	65%	0.13
Male	46%	51%	44%	0.58
Female	54%	49%	56%	0.58
Age (yrs)	35.9 (12.0)	34.1 (12.5)	36.3 (11.8)	0.46
BMI (kg m^{-2})	23.8 (3.5)	24.2 (3.1)	23.2 (4.4)	0.18
ASA I category	68 (53%)	46%	57%	0.33
ASA II category	59 (46%)	54%	41%	0.23
ASA III category	1 (1%)	0 (0%)	1 (1%)	0.62
<i>Living condition</i>				
Rural	61%	66%	58%	0.62
City	39%	32%	42%	0.37
<i>Education</i>				
Primary school	14%	17%	12%	0.62
High school	6%	7%	5%	0.96
Professional school	67%	63%	68%	0.72
University	13%	13%	15%	0.97
<i>Civil status</i>				
Married	43%	43%	43%	0.85
Single	51%	51%	51%	0.85
Divorced/separated	6%	6%	6%	0.69
<i>Work activity</i>				
Full time	55%	59%	53%	0.65
Part time	22%	20%	22%	0.69
Student	6%	7%	6%	0.87
Homemaker	8%	5%	9%	0.66
Retired	1%	0%	1%	0.62
Disabled	4%	7%	2%	0.36
Other	4%	2%	7%	0.44
<i>Operated hip</i>				
Right	54%	59%	52%	0.58
Left	45%	39%	48%	0.44
Both sides	1%	2%	0%	0.88
<i>Comorbidities</i>				
None	58%	59%	59%	0.85
One	30%	29%	31%	0.98
Two	9%	10%	8%	0.79
Three	3%	2%	2%	0.50

Reasons for surgery

Alleviation of pain was the most common reason stated for making the decision to undergo hip surgery, being the foremost reason for 33% patients and the second most important reason for a further 28% (Table II). Fear of worsening of the situation was the next most common reason, with 20% patients choosing this option as their prime reason for surgery. 16% chose as their major reason an anticipated improvement in the ability to perform everyday activities, 11%, the fact that other therapies had not helped and 10% an anticipated improvement in the ability to play sport.

Pre-operative expectations

The pre-operative expectations for each of the outcome measures are shown in Table III. Consistent with the main aim of surgery, more than half of the group (57%) expected that their hip pain would be “much better” and a further 40% expected it would be “better”. A high proportion also expected their ability to do sport to be much better (46%) or better (37%).

For each of the items pain, walking, sport, and general physical capacity, only few patients ($< 13\%$) expected *no change*, whereas for the items independence in everyday activities or the frequency/

Table II
Main reasons for deciding to undergo surgery for the FAI problem

Reason	% Patients rating reason as first most important	% Patients rating reason as second most important	% Patients rating reason as third most important
Pain reduction	32.7	28.3	13.1
Fear of worsening of the situation	19.8	15.2	22.2
Improvement in performance of everyday activities	15.8	16.2	17.2
Other therapies didn't help; something has to be done	10.9	10.1	7.1
Improvement in ability to do sport	9.9	19.2	19.2
Doctor's recommendation	5.9	4.0	14.1
Retain independence	4.0	3.0	1.0
Improvement in walking capacity	1.0	4.0	6.1
Total	100	100	100

quality of social contacts 32% and 54%, respectively, expected no change. Approximately half (58%) of the patients expected their mental well-being to be better/much better after surgery.

Expectations met: "expectations–actuality discrepancy"

In comparison with the actual perceived improvement registered at 12 months, the expectations declared before surgery had been overly optimistic in more than 50% patients for hip pain, sport and general physical capacity, and in 34–46% patients for independence, mental well-being, and walking capacity (Fig. 1). In 21% of patients, expectations for social function were not met.

GTO 12 months after surgery

The ratings of the overall effectiveness of treatment, 12 months after surgery, were as follows: operation helped a lot, 29%; helped, 39%; helped only little 21%, didn't help, 9%; made things worse 2%.

Factors explaining the variance in treatment effectiveness (GTO)

None of the baseline expectations or the demographic variables made a significant contribution to explaining the variance in global treatment outcome ($P > 0.149$). Univariate analyses showed that GTO was significantly ($P < 0.001$) correlated with OHS at 12 months ($r = -0.48$), and with expectations being fulfilled for pain ($r = -0.70$), walking capacity ($r = -0.46$), independence in everyday activities ($r = -0.24$), ability to do sport ($r = -0.64$), general physical capacity ($r = -0.41$) and mental well-being ($r = -0.50$).

The results of the multiple regression analysis are shown in Table IV. The variables that showed a unique positive association with GTO in the final step were: expectations being fulfilled for pain (explaining 47% of the variance in GTO; $P < 0.001$) and expectations

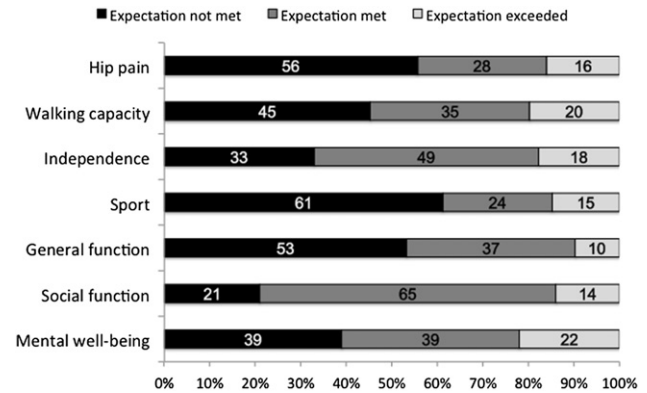


Fig. 1. Proportions of patients whose expectations were not met, were met exactly, and were exceeded for each of the outcome domains, as measured prospectively by the difference between pre-operative expectations of improvement and the actual improvement reported at 12-months post-operatively. ($n = 69-82$; the analyses excluded those patients who indicated "don't know" for their pre-operative expectations.)

being fulfilled for sport (explaining a further 12% variance; $P < 0.001$). The final model explained 59% of the variance in GTO. The unstandardized regression coefficients (B values) for the model constants were 0.728 ($P < 0.001$) in model 1 and 0.617 ($P < 0.001$) in model 2. Residuals were close to normality and were uniform, indicating homoscedasticity.

Discussion

Scientific interest in FAI is increasing, as shown by the exponential growth of publications on the topic^{1,29}. However, to date, no studies have examined either the types of treatment expectations that patients with FAI typically hold, or the role that such expectations have in relation to subsequent ratings of treatment outcome. Several studies have investigated the influence of pre-surgical expectations on outcome in patients undergoing total hip arthroplasty^{4,7,8,13-22}; however, as patients with FAI are typically much younger and more active than those receiving a hip replacement, the demands and expectations of treatment are expected to differ accordingly. The present prospective study sought to document in patients with FAI the pre-operative expectations of surgery and to examine the extent to which their subsequent self-ratings of global treatment outcome, 1 year after surgery, were determined by their prior expectations, their expectations being met, or their actual symptom/functional status at the 1-year follow-up.

Overall, the results from the present study refuted the notion that baseline expectations, *per se*, are important determinants of outcome. Alone, these had no significant correlation with the ratings of GTO. This concurs with the findings from some previous studies on orthopaedic patients³⁰, and especially those where multivariate models have been used to assess the relative importance of different predictors^{23,31}. It would hence appear that simply

Table III
Patients' expectations of the extent of change in each outcome after surgery (% patients within each expectation category)

	Much better %	Better %	Somewhat better %	Unchanged %	Worse %	Don't know %
Hip pain	56.7	40.2	2.4	0	0	0.8
Walking capacity	29.6	44.0	12.8	12.8	0	0.8
Independence in everyday activities	22.6	31.5	10.5	31.5	0	4.0
Ability to do sport	45.7	37.0	10.2	4.7	0	2.4
General physical capacity	32.0	46.9	10.9	9.4	0	0.8
Frequency and quality of social contacts	11.3	14.5	10.5	54.0	0	9.7
Mental well-being	30.2	27.8	17.4	23.0	0	1.6

Table IV
Results of the multiple regression analysis ($n=67$ with complete data sets at baseline and follow-up for all potential predictors)

	Standardized coefficients		Correlations		R^2	Adjusted R^2	R^2 step change
	Beta	Sig.	Zero-order	Partial			
<i>Step 1</i>							
Expectations fulfilled for pain	-0.685	<0.0001	-0.685	-0.685	0.47	0.46	0.47
<i>Step 2</i>							
Expectations fulfilled for pain	-0.458	<0.0001	-0.685	-0.516			
Expectations fulfilled for sport	-0.417	<0.0001	-0.666	-0.48	0.59	0.58	0.12

expecting the optimal result in a given domain after surgery is not in itself sufficient to guarantee that such improvement will be achieved; instead, the fulfilment of realistic expectations appears to be the critical determinant. In the multivariable regression model, the “expectations–actuality discrepancy” scores for pain and sport were each significant predictors of treatment effectiveness. The pivotal role for the mismatch between expectations and the actual result supports one of the most popular models of satisfaction with medical treatment^{32,33} and also confirms the findings of some previous studies on surgical patients^{3,4}. That expectations in the domains of pain and sport were the ones most strongly related to global outcome also seems logical, since the typical patient with FAI is highly active and regularly participates in sport^{34–37}. Indeed, it is for this reason that health related quality of life questionnaires that have been specially developed for young and middle-aged individuals with hip disorders typically include subscales specific for sport and recreational activities. This is the case, for example, for the Hip dysfunction and Osteoarthritis Outcome Score³⁸ and the Hip Outcome Score³⁹. Our findings provide further support for the notion that these two dimensions (pain and sport) are of great importance to assess when evaluating the outcome of surgery in patients with FAI.

If the discrepancy between “what I expect” and “what I get” is so critical, then it might be anticipated that levels of satisfaction could be manipulated by deliberately lowering the threshold of expectations. In medicine, however, this is unlikely to represent a practical approach: predicting overly pessimistic outcomes for medical care would likely result in a total loss of confidence in the healthcare provider and perhaps even the refusal to undergo (necessary) treatment. Instead, it would appear that what is needed is a *realistic* appraisal of the specific expectations that the patient can hold – which, in turn, can only be delivered by the widespread and systematic evaluation of outcome – and this should be communicated to and discussed with the patient prior to surgery. Future studies should also examine the agreement between patients’ and surgeons’ pre-operative expectations of outcome as well as their perspectives on whether the surgical goals were achieved. Indeed, it has been suggested that for a balanced view of the surgical result, outcomes should be assessed from the perspectives of both the patient and the surgeon⁴⁰.

In general, the baseline surgery expectations of patients with FAI were high, and, in some domains, they far exceeded the actual results achieved. This overestimation of the likely improvement after orthopaedic surgery has been reported before for various other surgical procedures^{23,37,41,42} including total joint arthroplasty^{31,43}. Some of the most realistic expectations concerned

outcomes that are commonly only a “by-product” of a successful operation, such as an improved psychological well-being and a fuller social life. In the present study, the greatest discrepancies in “expectations vs actual results” concerned the symptoms and function domains: hip pain, the ability to play sport, and general physical capacity. Since these also represent the patients’ primary reasons for undergoing surgery, the extent of improvement that can realistically be achieved in these domains clearly needs to be discussed in more detail with the patient before surgery, during the pre-operative informed consent process.

The salient features of the present study include its prospective nature with 12-months’ follow-up, its use of standardised outcome measures to monitor perceived symptoms/function (OHS), and its examination of various domains for which patients may hold expectations. However, various limitations also need to be acknowledged. The questionnaire used to assess the (pre-op) expectations of improvement and the (post-op) achievement of improvement has not yet been validated in patients with FAI. It was developed for use in patients undergoing spine surgery²³, with the items being modified accordingly to make it suitable for hip problems. Currently, there exist no standardised or validated questionnaires for assessing the expectations of patients undergoing surgery for FAI. Previous studies in orthopaedics research have made it clear that multiple items, with multiple response categories, are preferable to simple dichotomised responses (yes/no or better/worse in relation to an expected outcome), as the latter have been shown to be too insensitive^{9,44}. The questionnaire used in the present study had multiple response categories, and adaptation of the wording to make it applicable to patients with FAI was a relatively straightforward procedure. Further, pilot analyses revealed that, in the main, the responses to the individual items assessing “actual improvement in a given domain at 12 months” showed moderately high, significant ($P < 0.02$) correlations with the change-scores for the corresponding domains as measured with longer questionnaires such as the OHS, the WOMAC sub-domains, and the SF-36 sub-scores (details not shown; unpublished data). This adds additional support for the applicability of the questionnaire in this patient group.

A further limitation of the study is that the 12-month follow-up rate was only 67%; however, the OHS scores of respondents and non-respondents showed similar values at baseline and all available follow-up time points. Furthermore, only three patients out of 21 that did not send back the 12-month questionnaire and were reached by phone declared that this was because they were disappointed with their result. This suggests there was no major selection bias. Nonetheless, differences between responders and non-responders in other unmeasured factors may still have resulted in residual bias.

The choice of “global outcome” measure used as the dependent variable may have influenced the independent variables that were selected as significant predictors. Different constructs are used in conceptualising patient-centred ratings of global outcome: some focus on the actual effectiveness of treatment, i.e., therapeutic improvement (symptom or functional), whilst others focus more on satisfaction with treatment delivery (i.e., the process of care, or the patient–provider relationship). Whilst the two are often related, they are not synonymous^{31,45}. In the present study we elected to use an item enquiring as to “how much the operation helped the hip problem”, i.e., a patient-friendly measure of treatment effectiveness, as the dependent variable of interest. Conceivably, had we used an item focussing on overall satisfaction with care, the results may have been different. Finally, we used a forward stepwise multiple regression analysis rather than a hierarchical approach where the variables are entered based on theoretical considerations. However, given the exploratory nature of the

present study, the use of a statistical selection was considered appropriate.

In conclusion, in the group of patients with FAI examined, expectations of surgery were generally overly optimistic, especially for the domains that constituted the primary concern to the patient pre-operatively. The actual level of symptoms/function at 12 months (as determined by the OHS score) was important for a good outcome when examined in univariate analysis, but it did not explain any unique variance in global outcome in the multivariable analysis; only the fulfilment of expectations for pain and sport made a significant contribution in the final model. The results emphasise the importance of routinely assessing patient-oriented outcome and the factors influencing it, such that realistic expectations for every outcome domain can be discussed with the patient prior to surgery. This can be expected to address any misconceptions regarding the likely results of surgery, and ultimately improve the overall patient-rated outcome.

Author contributions

FMI, AFM, FDN, and ML were all responsible for the conception and design of the main study, of which this sub-study is part, and FMI, AFM, FDN and ML acquired funding for the project. ML provided study patients. FMI coordinated all the practical work and acquisition of data. FMI and AFM performed the statistical analysis and interpreted the data. AFM created the first draft of the manuscript and FMI, FDN, and ML edited and revised it for important intellectual content. All authors read and approved the final manuscript. FMI and AFM take responsibility for the integrity of the work as a whole, from inception to finished article.

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Conflict of interest

All the authors declare that they have no financial and personal relationships with other people or organisations that could potentially and inappropriately influence (bias) their work and conclusions.

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References

- Leunig M, Beaulé PE, Ganz R. The concept of femoroacetabular impingement: current status and future perspectives. *Clin Orthop Relat Res* 2009;467:616–22.
- Leunig M, Ganz R. FAI – concept and etiology. *Orthopade* 2009;38:394–401.
- Pager CK. Expectations and outcomes in cataract surgery: a prospective test of 2 models of satisfaction. *Arch Ophthalmol* 2004;122:1788–92.
- Mancuso CA, Jout J, Salvati EA, Sculco TP. Fulfillment of patients' expectations for total hip arthroplasty. *J Bone Joint Surg Am* 2009;91:2073–8.
- Flood AB, Lorence DP, Ding J, McPherson K, Black NA. The role of expectations in patients' reports of post-operative outcomes and improvement following therapy. *Med Care* 1993;31:1043–56.
- Engel C, Hamilton NA, Potter PT, Zautra AJ. Impact of two types of expectancy on recovery from total knee replacement surgery (TKR) in adults with osteoarthritis. *Behav Med* 2004;30:113–23.
- Mahomed NN, Liang MH, Cook EF, Daltroy LH, Fortin PR, Fossel AH, et al. The importance of patient expectations in predicting functional outcomes after total joint arthroplasty. *J Rheumatol* 2002;29:1273–9.
- Gandhi R, Davey JR, Mahomed N. Patient expectations predict greater pain relief with joint arthroplasty. *J Arthroplasty* 2009;24:716–21.
- Iversen MD, Daltroy LH, Fossel AH, Katz JN. The prognostic importance of patient pre-operative expectations of surgery for lumbar spinal stenosis. *Patient Educ Couns* 1998;34:169–78.
- Scheier MF, Carver CS. Dispositional optimism and physical well-being: the influence of generalized outcome expectancies on health. *J Pers* 1987;55:169–210.
- Linder-Pelz S. Social psychological determinants of patient satisfaction: a test of five hypothesis. *Soc Sci Med* 1982;16:583–9.
- Carr-Hill RA. The measurement of patient satisfaction. *J Public Health Med* 1992;14:236–49.
- Suda AJ, Seeger JB, Bitsch RG, Krueger M, Clarius M. Are patients' expectations of hip and knee arthroplasty fulfilled? A prospective study of 130 patients. *Orthopedics* 2010;33:76–80.
- Gonzalez Saenz de Tejada M, Escobar A, Herrera C, Garcia L, Aizpuru F, Sarasqueta C. Patient expectations and health-related quality of life outcomes following total joint replacement. *Value Health* 2010;13:447–54.
- Anakwe RE, Jenkins PJ, Moran M. Predicting dissatisfaction after total hip arthroplasty: a study of 850 patients. *J Arthroplasty* 2011;26:209–13.
- Brokelman R, van Loon C, van Susante J, van Kampen A, Veth R. Patients are more satisfied than they expected after joint arthroplasty. *Acta Orthop Belg* 2008;74:59–63.
- Mancuso CA, Salvati EA, Johanson NA, Peterson MG, Charlson ME. Patients' expectations and satisfaction with total hip arthroplasty. *J Arthroplasty* 1997;12:387–96.
- Mancuso CA, Sculco TP, Salvati EA. Patients with poor preoperative functional status have high expectations of total hip arthroplasty. *J Arthroplasty* 2003;18:872–8.
- Mancuso CA, Graziano S, Briskie LM, Peterson MG, Pellicci PM, Salvati EA, et al. Randomized trials to modify patients' preoperative expectations of hip and knee arthroplasties. *Clin Orthop Relat Res* 2008;466:424–31.
- Groeneveld PW, Kwok CK, Mor MK, Appelt CJ, Geng M, Gutierrez JC, et al. Racial differences in expectations of joint replacement surgery outcomes. *Arthritis Rheum* 2008;59:730–7.
- van den Akker-Scheek I, van Raay JJ, Reininga IH, Bulstra SK, Zijlstra W, Stevens M. Reliability and concurrent validity of the Dutch hip and knee replacement expectations surveys. *BMC Musculoskelet Disord* 2010;11:242.
- Woolhead G, Donovan J, Dieppe P. Patient expectations and total joint arthroplasty. *J Rheumatol* 2003;30:1656–7. author reply 1657.
- Mannion AF, Junge A, Elfering A, Dvorak J, Porchet F, Grob D. Great expectations: really the novel predictor of outcome after spinal surgery? *Spine* 2009;34:1590–9.

24. Daltroy LH, Cats-Baril WL, Katz JN, Fossel AH, Liang MH. The North American spine society lumbar spine outcome assessment instrument. Reliability and validity tests. *Spine* 1996;21:741–9.
25. Mannion AF, Junge A, Grob D, Dvorak J, Fairbank JC. Development of a German version of the Oswestry Disability Index. Part 2: sensitivity to change after spinal surgery. *Eur Spine J* 2006;15:66–73.
26. Impellizzeri FM, Mannion AF, Naal FD, Hersche O, Leunig M. The early outcome of surgical treatment for femoroacetabular impingement: success depends on how you measure it. *Osteoarthritis Cartilage* 2012;20:638–45.
27. Dawson J, Fitzpatrick R, Murray D, Carr A. A response to issues raised in a recent paper concerning the Oxford knee score. *Knee* 2006;13:66–8.
28. Heiberger RM, Holland B. *Statistical Analysis and Data Display*. New York: Springer; 2004.
29. Botser IB, Smith Jr TW, Nasser R, Domb BG. Open surgical dislocation versus arthroscopy for femoroacetabular impingement: a comparison of clinical outcomes. *Arthroscopy* 2011;27:270–8.
30. Lutz GK, Butzlaff ME, Atlas SJ, Keller RB, Singer DE, Deyo RA. The relation between expectations and outcomes in surgery for sciatica. *J Gen Intern Med* 1999;14:740–4.
31. Mannion AF, Kampfen S, Munzinger U, Kramers-de Quervain I. The role of patient expectations in predicting outcome after total knee arthroplasty. *Arthritis Res Ther* 2009;11:R139.
32. Thompson AG, Sunol R. Expectations as determinants of patient satisfaction: concepts, theory and evidence. *Int J Qual Health Care* 1995;7:127–41.
33. Kravitz RL. Patients' expectations for medical care: an expanded formulation based on review of the literature. *Med Care Res Rev* 1996;53:3–27.
34. Sierra RJ, Trousdale RT, Ganz R, Leunig M. Hip disease in the young, active patient: evaluation and nonarthroplasty surgical options. *J Am Acad Orthop Surg* 2008;16:689–703.
35. Clohisy JC, Knaus ER, Hunt DM, Lesher JM, Harris-Hayes M, Prather H. Clinical presentation of patients with symptomatic anterior hip impingement. *Clin Orthop Relat Res* 2009;467:638–44.
36. Naal FD, Miozzari HH, Wyss TF, Notzli HP. Surgical hip dislocation for the treatment of femoroacetabular impingement in high-level athletes. *Am J Sports Med* 2011;39:544–50.
37. Saban KL, Penckofer SM, Androwich I, Bryant FB. Health-related quality of life of patients following selected types of lumbar spinal surgery: a pilot study. *Health Qual Life Outcomes* 2007;5:71.
38. Nilsson AK, Lohmander LS, Klassbo M, Roos EM. Hip disability and osteoarthritis outcome score (HOOS) – validity and responsiveness in total hip replacement. *BMC Musculoskelet Disord* 2003;4:10.
39. Martin RL, Kelly BT, Philippon MJ. Evidence of validity for the hip outcome score. *Arthroscopy* 2006;22:1304–11.
40. Porchet F, Lattig F, Grob D, Kleinstueck FS, Jeszenszky D, Paus C, et al. Comparison of patient and surgeon ratings of outcome 12 months after spine surgery. *J Neurosurg Spine* 2010;12:447–55.
41. McGregor AH, Hughes SP. The evaluation of the surgical management of nerve root compression in patients with low back pain: part 2: patient expectations and satisfaction. *Spine* 2002;27:1471–6. discussion 1476–7.
42. Toyone T, Tanaka T, Kato D, Kaneyama R, Otsuka M. Patients' expectations and satisfaction in lumbar spine surgery. *Spine* 2005;30:2689–94.
43. Hawker GA. Who, when, and why total joint replacement surgery? The patient's perspective. *Curr Opin Rheumatol* 2006;18:526–30.
44. Vroman K, Arnsberger P, Stevens T, Williams N. A rehabilitation clients' recovery expectations and their relationship to functional outcomes. *J Allied Health* 2005;34:51–5.
45. Carlson J, Youngblood R, Dalton JA, Blau W, Lindley C. Is patient satisfaction a legitimate outcome of pain management? *J Pain Symptom Manage* 2003;25:264–75.