

## A systematic review of patient reported outcomes and patient experience in enhanced recovery after orthopaedic surgery

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### ABSTRACT

**INTRODUCTION** Orthopaedic enhanced recovery after surgery (ERAS) providers are encouraged to estimate the actual benefit of ERAS according to the patient's opinion by using patient generated data alongside traditional measures such as length of stay. The aim of this paper was to systemically review the literature on the use of patient generated information in orthopaedic ERAS across the whole perioperative pathway.

**METHODS** Publications were identified using Embase™, MEDLINE®, AMED, CINAHL® (Cumulative Index to Nursing and Allied Health Literature), the Cochrane Library and the British Nursing Index. Search terms related to experiences, acceptance, satisfaction or perception of ERAS and quality of life (QoL).

**FINDINGS** Of the 596 abstracts found, 8 papers were identified that met the inclusion criteria. A total of 2,208 patients undergoing elective hip and knee arthroplasty were included. Patient satisfaction was reported in 6 papers. Scores were high in all patients and not adversely affected by length of stay. QoL was reported in 2 papers and showed that QoL scores continued to increase up to 12 months following ERAS. Qualitative methods were used in one study, which highlighted problems with support following discharge. There is a paucity of data reporting on patient experience in orthopaedic ERAS. However, ERAS does not compromise patient satisfaction or QoL after elective hip or knee surgery. The measurement of patient experience should be standardised with further research.

### KEYWORDS

Enhanced recovery after surgery – Fast track – Patient experience – Orthopaedic

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Enhanced recovery after surgery (ERAS) seeks to optimise perioperative wellbeing by reducing the surgical stress response.<sup>1</sup> To date, the outcome of ERAS pathways has been measured using length of hospital stay (LOS), readmission and complication rates. However, there is now a drive to capture the patient's perspective and patient reported outcome measures (PROMs) have been used to do this. PROMs are validated measures of any aspect of health that come from the patients themselves.<sup>2</sup> They include satisfaction and quality of life (QoL) scores. Their collection for elective total hip and total knee arthroplasty patients has been mandatory in the National Health Service (NHS) since 2009.<sup>3</sup> Patient experience is another aspect of the patient's perspective, and is considered to have equal standing alongside clinical effectiveness and patient safety as an indicator of quality.<sup>4</sup>

In the UK, patient experience data are collected using the NHS patient survey programme, the NHS friends and family test,<sup>5</sup> non-validated questionnaires, interviews and

focus groups.<sup>6</sup> The aim of this paper was to systemically review the literature on the use of patient generated information in orthopaedic ERAS across the whole perioperative pathway.

### Methods

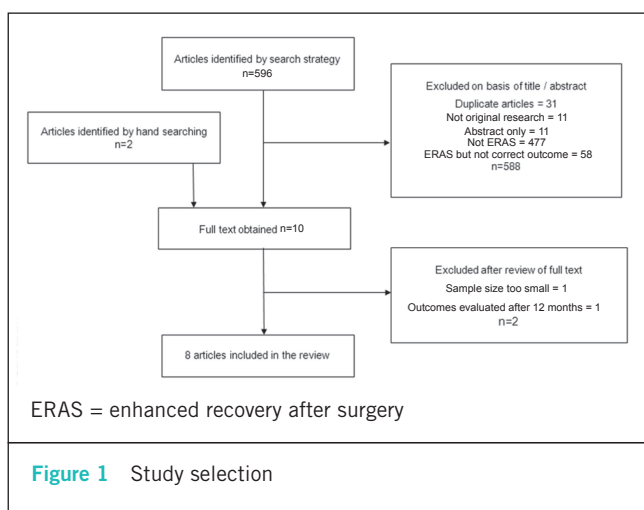
Guidelines for the preferred reporting items for systematic reviews and meta-analysis were followed.<sup>7</sup> Embase™, MEDLINE®, AMED, CINAHL® (Cumulative Index to Nursing and Allied Health Literature), the Cochrane Library and the British Nursing Index were searched. The search strategy is summarised in Table 1. The most recent search was performed on 8 February 2013.

### Eligibility criteria

Studies published between 1 January 2000 and 8 February 2013 were included to promote capture of all papers pub-

**Table 1 Literature search strategy**

<b>Set 1:</b> Enhanced recovery after surgery search terms	enhanced recovery OR eras OR rapid recovery OR (fast AND track) OR fast-track OR multimodal OR multi-modal OR accelerated discharge OR early discharge OR early rehabilitation.ti,ab [Limit to: Publication Year 2000-Current]
<b>Set 2:</b> Patient reported outcome search terms	quality of life OR qol OR hrql OR hrqol OR patient-reported OR patient reported OR PRO OR PROM OR outcome measure OR outcome assessment OR health status OR well being OR well-being OR wellbeing OR health survey OR Euroqol OR EQ-5D OR EQ-3D OR SF-36 OR stress OR anxiety OR depression OR psychosocial OR psycho-social OR self-concept OR expectation* OR satisf* OR dissatisf* OR perspective OR patient* experience* OR experience* of patient*.ti,ab [Limit to: Publication Year 2000-Current]
<b>Set 3:</b> Orthopaedic search terms	musculo* OR orthopaedic* OR orthopedic* OR hip* OR knee* OR arthroplast* OR replacement OR replace*.ti,ab [Limit to: Publication Year 2000-Current] NOT: humerus OR humeral OR shoulder* OR colorectal OR colo-rectal OR bowel OR colon* OR rectum



lished since ERAS was implemented in clinical practice. Studies were eligible if they assessed QoL and satisfaction in orthopaedic ERAS, if they had 10 participants or more and if they reported outcomes within 12 months of surgical intervention. Studies with functional outcomes such as the Oxford knee score were excluded as they report on physical operative outcome and we aimed to report on the patient’s perspective of care.

**Study selection**

Two reviewers (EJ and TW) independently assessed titles and abstracts. Search results were supplemented with hand searching (EJ). Methodological quality was assessed using the Newcastle–Ottawa scale<sup>8</sup> (non-randomised studies) and the hierarchy of evidence-for-practice<sup>9</sup> (qualitative studies). This involved scrutinising sampling theory and generalisability. The quality of PROM reporting was evaluated using standards developed by the Task Force of the International Society for Quality of Life Research (Table 5).<sup>10</sup>

**Results**

The search strategy identified 596 abstracts. Of these, 588 were excluded by review of the title and/or abstract (Fig 1).

Two additional articles were added following hand searching. A total of 8 articles were therefore included describing 2,208 orthopaedic ERAS patients.

**Study characteristics**

Of the eight articles included, five were non-randomised comparative studies, one was a national survey, one a case series and one a qualitative study. Studies were conducted in Denmark and the UK.

Our review revealed three patient generated outcome measures: patient satisfaction questionnaires (PSQs), QoL PROMs and qualitative interview data. The results are summarised in Tables 2–4.

**Patient satisfaction**

Six studies used PSQs: four comparative studies, one national survey and one case series (Table 2). PSQs were implemented during hospitalisation as well as up to 12 months postoperatively for patients with cemented, uncemented and hybrid procedures included. Uniformly high satisfaction scores were found across the dataset.

Only one study compared ERAS with traditional care: Barker *et al* studied 41 patients undergoing unicompartmental knee replacement (UKR) who were allocated to a 24-hour versus a 5-day postoperative stay.<sup>11</sup> Disease specific questionnaires (adapted from Mahomed *et al*)<sup>12</sup> completed at six months related to analgesia, ability to perform home and recreational activities, LOS and overall surgical result. There was no statistically significant difference between the two groups and Barker *et al* suggested that through enrolment in the study, greater patient education improved scores across both groups. However, 14 of the 20 patients managed conventionally reported that they would prefer a shorter LOS.

Husted *et al* (in 2008<sup>15</sup> and 2011<sup>14</sup>) used PSQs before discharge. They evaluated LOS, the entire stay, patient information, operating room stay, recovery ward stay, nursing, doctors’ ward rounds, pain management, physiotherapy, environment and information. From a cohort of 712 ERAS patients, there was no statistically significant difference in patient satisfaction or LOS between total knee replacement (TKR) and total hip replacement (THR) patients.<sup>15</sup> High satisfaction was associated with a shorter LOS, increasing age, being married, reduced need for analgesia and reduced co-

Paper	Methodology	Groups compared	Results	Sample size
Barker, 2006 <sup>11</sup>	Comparative	Unicompartmental knee replacement: ERAS ( $n=21$ ) vs standard care ( $n=20$ )	ERAS and standard care groups highly satisfied	41
Husted, 2008 <sup>13</sup>	Comparative	THR ( $n=370$ ) compared with TKR ( $n=342$ ). ERAS only.	Positive correlation between reduced LOS and overall satisfaction. High satisfaction scores during all parts of hospital stay. No significant difference between TKR and THR.	712
Husted, 2011 <sup>14</sup>	Comparative	Bilateral TKR ( $n=150$ ) compared with unilateral TKR ( $n=271$ ) matched for sex but not age. ERAS only.	Patient satisfaction uniformly high with no significant difference across unilateral and bilateral TKR patients	421
Larsen, 2012 <sup>15</sup>	Comparative	TKR and UKR compared with normative population data. ERAS only.	Sex, age, implant type or preoperative QoL did not significantly predict patient satisfaction at 12 months.	157
Husted, 2010 <sup>16</sup>	National survey	THR and TKR: outcomes data compared between hospitals with shorter and longer LOS	Significantly higher patient satisfaction with doctors' communication in hospitals with shorter LOS	563
Husted, 2011 <sup>17</sup>	Case series	Revision knee replacement. ERAS only.	High patient satisfaction regarding LOS and entire stay	29

ERAS = enhanced recovery after surgery; THR = total hip replacement; TKR = total knee replacement; LOS = length of stay; UKR = unicompartmental knee replacement; QoL = quality of life

Paper	Methodology	Groups compared	Results	Sample size
Larsen, 2012 <sup>15</sup>	Comparative	TKR and UKR compared with normative population data. ERAS only.	TKR and UKR ERAS patients with low preoperative QoL scores have additional need for postoperative rehabilitation.	211
Larsen, 2010 <sup>18</sup>	Comparative	THR compared with normative population data. ERAS only.	EQ-5D™ score continues to rise up to 12 months following surgery, reaching higher than the population norm. Some SF-36® parameters did not reach population norm at 3 months but matched it at 12 months.	196

TKR = total knee replacement; UKR = unicompartmental knee replacement; ERAS = enhanced recovery after surgery; QoL = quality of life; THR = total hip replacement

morbidities. In a comparative study of simultaneous bilateral ( $n=150$ ) versus unilateral TKR ( $n=271$ ) with a two-year follow-up period, satisfaction scores were uniformly high despite a higher LOS in the bilateral group.<sup>14</sup>

In 2012 Larsen *et al* examined the association between satisfaction, QoL and function in 157 consecutive ERAS primary elective TKR and UKR patients, compared with an age matched normative population.<sup>15</sup> No satisfaction parameters were given so conclusions cannot be drawn regarding specific aspects of the ERAS pathway. Overall satisfaction at 12 months was predicted by functional ability but not by sex, age, implant type or preoperative QoL.

Husted *et al*'s 2010 national survey reported on 563 patients undergoing cemented, hybrid and uncemented THR ( $n=312$ ) and TKR ( $n=251$ ), comparing short and long LOS.<sup>16</sup> All patients were sent PSQs that focused on hospital stay and LOS. The study found equal or better satisfaction with all parts of stay for shorter LOS patients, especially with the continuity of doctors' rounds and preoperative information.

Husted *et al*'s prospective case series from 2011 reports on 29 patients undergoing revision knee arthroplasty (one bilateral).<sup>17</sup> A PSQ was issued relating to their hospital stay and results revealed that revision TKR patients receiving ERAS can achieve satisfaction outcomes similar to those reported after primary TKR.

The cohort studies reviewed represent relatively high technical methodological quality; Husted *et al* (2011)<sup>14</sup> score 7/9, and Barker *et al*,<sup>11</sup> Husted *et al* (2008)<sup>15</sup> and Larsen *et al*<sup>15</sup> score 5/9 on the Newcastle–Ottawa scale. PSQ reporting standards were generally high (Table 5). However, rationale for the use of a satisfaction measure and its limitations were poorly reported.

#### Quality of life

Two comparative studies used QoL questionnaires as their primary outcome (Table 3). Larsen *et al* measured QoL variables before and after surgery in 211 TKR/UKR patients<sup>15</sup> and in 196 THR patients.<sup>18</sup> Follow-up was undertaken at 4

**Table 4** Articles reporting on qualitative data in orthopaedic enhanced recovery after surgery

Paper	Methodology	Groups compared	Results	Sample size
Hunt, 2009 <sup>19</sup>	Qualitative: interviews	Primary THR ERAS vs standard care	Patients' acceptance of early discharge masks doubts and concerns.	35

THR = total hip replacement; ERAS = enhanced recovery after surgery

**Table 5** Quality of patient reported outcome (PRO) information (adapted from the International Society for Quality of Life Research suite of reporting standards for health related quality of life outcomes of randomised clinical trials)<sup>10</sup>

PRO identified as an outcome in the abstract
PRO hypothesis stated
Mode of applying PRO stated
Rationale for choice of PRO stated
Evidence of validity and reliability provided
Intended data collection schedule provided
Status as primary or secondary outcome reported
Evidence of statistical testing for each PRO
Missing data reported explicitly (reasons why and statistics)
Baseline PROs stated with patient characteristics
Limitations of PROs discussed explicitly, including generalisability
Clinical relevance of PRO findings discussed
PRO results discussed in context of other trial outcomes

and 3 months following surgery respectively as well as at 12 months in both groups. Generic (SF-36<sup>®</sup>) and utility (EuroQol EQ-5D<sup>™</sup>) instruments were chosen with a clear rationale. Both studies used a sample that was age and sex matched to the general population. The knee replacement and hip replacement studies scored 5/9 and 6/9 respectively on the Newcastle–Ottawa scale.

The EQ-5D<sup>™</sup> scores of the THR cohort (at or above 55 years old) had reached the normative population level at 3 months after surgery and continued to rise to above the population norm at 12 months.<sup>18</sup> There was a 77% follow-up rate at 12 months after surgery.

Some knee arthroplasty patients with low preoperative QoL did not regain QoL outcomes compared with the normative group at 12 months postoperatively.<sup>15</sup> Those scoring highly before surgery reached the population norm at four months. QoL data continued to change up to 12 months across 6 parameters: mental health, social functioning, general health, vitality, bodily pain and role limitation due to emotional problems.

**Qualitative studies**

One paper reported on patient experience of ERAS using qualitative methods: Hunt *et al* recruited 15 ERAS patients and 20 traditional care patients across two hospitals.<sup>19</sup> The study was classified as level III (descriptive)<sup>9</sup> as the sample was not diversified to analyse exactly why differences occurred despite using a good range of illustrative quota-

tions. The semistructured interviews were conducted in the clinic or at home, 2–5 days postoperatively. Only 2 of the 31 patients directly addressed their LOS and when prompted, they did not question or criticise their LOS. ERAS patients found it difficult to believe a shorter recovery time would be possible but accepted the concept of early discharge. The authors suggested that the ‘true views’ of the participants regarding LOS were hidden, implying that their ‘acceptance’ masked underlying concerns.

**Discussion**

Enhanced recovery after orthopaedic surgery demands a multimodal service, which is influenced by the many overlapping factors of recovery. The integration of patient generated data is required in order to provide a high quality, patient centred service.

Our review has revealed that a variety of patient generated data measurement tools are used in orthopaedic ERAS. These include PSQs, QoL PROMs and interviews. Owing to methodological shortcomings in study design and heterogeneity, it was not possible to conduct a meta-analysis and caution should be observed in the generalisation of these data.

The review has shown, however, that ERAS did not compromise patient satisfaction and that patients prefer a shorter LOS. Reasons reported included favouring being at home with relatives and not wanting to ‘clog up a hospital bed’.

Furthermore, patient satisfaction was not influenced by the type of surgery (hip vs knee surgery, implant type, or unilateral or bilateral procedures). Factors underpinning high patient satisfaction with ERAS pathways included patient education,<sup>11,13</sup> continuity of doctors' rounds and reduced need for analgesia.<sup>15</sup> Conversely, poor satisfaction was associated with higher levels of postoperative pain.<sup>11</sup>

These patient satisfaction data provide an indication of which elements of the ERAS pathway are most important to patients. Nevertheless, although the UK paper describes the provision of extra information due to participation in a trial, the level of patient information provided or the manner in which it was delivered in UK or Danish units was not described, making it difficult to translate these findings directly into improving ERAS delivery.

The problem of overly positive results in patient satisfaction reporting is well known<sup>20</sup> and Hunt *et al* also point this out, suggesting that acceptance of early discharge masks patients' real concerns.<sup>19</sup> Patient experience data may resolve some of these tensions by providing more detail about what circumstances surrounded those key ERAS components to make them satisfactory (or not) and why it was important to the patient.<sup>21</sup> This may achieve a greater impact on how care is delivered by enabling accurate identification of challenges, making data more useful to the service provider.

This review also revealed that QoL data continued to change up to 12 months postoperatively and may be used as a predictor of outcome as patients with low preoperative QoL scores could be targeted for more intensive postoperative rehabilitation. However, high QoL scores were also reported alongside lower functional ones.<sup>18</sup> PROMs analysis may not allow the clinician to understand what circumstances may have caused this conflicting relationship because PROMs are not able to capture all issues that are relevant to patients, including community life and participation.<sup>22</sup>

Qualitative methods are used widely across healthcare and recent progress in developing strategies to establish rigour have enabled qualitative methods to impact significantly on health outcomes research.<sup>23,24</sup> The qualitative data highlighted that recovery is a multidimensional phenomenon and that patient generated data are affected by perception. This subjectivity can create methodological problems including reporting bias<sup>25</sup> although mixed methods approaches have been suggested as a mechanism to overcome these challenges.

Clinicians may use these results to stimulate discussion about the importance of fully understanding how all the parts of the ERAS pathway contribute towards their patient's experiences. This may then act as a stepping stone to promote further research into the validation of a measure of patient experience. Accurate comparison and benchmarking of orthopaedic ERAS pathways against the outcome patient experience may enable faster identification of challenges, which will lead to improved service delivery and, ultimately, improved patient care. Finally, the successful integration of patient experience data into orthopaedic service delivery will depend on the readiness of clinical staff, hospital managers and commissioners to use these data.

## Conclusions

There is a variety of tools that are capable of capturing the patient's perspective. ERAS does not compromise patient satisfaction or quality of life after elective hip or knee replacement surgery. However, there are no bespoke or validated measures that are able to capture and measure how patients experience interactions in the ERAS setting. The measurement of patient experience should be standardised with further research.

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## Retraction of unreliable publication

The *Annals* has taken the unusual and serious step of retraction of a paper published in May 2013<sup>1</sup> because serious doubt has been cast on the reliability of the report. After publication we were informed by the Hospital Director of a hospital in Dubai named as the research site that the first author had worked there for a short time but that his employment ceased before the stated end of recruitment to the study. The paper had five authors, all based in Italy, yet the Methods section described patient recruitment only in the City Hospital, Dubai.

The hospital pointed out several discrepancies between the report that we published and their records. These included that:

- the author performed only 27 haemorrhoid operations at the hospital, yet the paper deals with a sample of 143 patients;
- the paper states that approval was granted by the Ethics Committee before research began but the records show that no approval was granted by the Ethics Committee or by the hospital management to conduct any study at the hospital;
- the report described telephone follow-up interviews with patients in 2012 although it was not standard practice to perform telephone follow-ups 40 months after operating. Furthermore, the authors did not have access to patient records from the City Hospital in 2012.

The *Annals* asked the authors to comment on all of these points. It transpired that approval from an Ethics Committee in Italy was obtained only after recruitment had ended. The authors have failed to provide a convincing description of how recruitment, randomisation and data collection continued after the departure of the first author and how the follow-up data were collected.

In view of the continued uncertainty about the origin and reliability of the data in this report we have withdrawn it and we have informed the relevant regulatory authorities

**Colin Johnson**, *Editor-in-Chief*

**Neil Mortensen**, *Chair of the Editorial Board*

**Mike Parker**, *Immediate Past Chair of the Editorial Board and Editor of the Bulletin*

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