



## REVIEW ARTICLE

# Postoperative Advice and Review in Uncomplicated Major Gynaecological Surgeries

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## Abstract

The post-operative care has generated a lot of discussion and controversy over the years and while certain issues have been resolved, others continue to be sources of debate. Optimisation of the immediate postoperative recovery during hospitalisation including postoperative pain control, time of first feeding, thrombo-prophylaxis and prevention of nausea and vomiting have been resolved. However, opinion is divided on a 6-week recovery period post-hysterectomy, the period of time patients has to refrain from driving, working or sexual activities as well as how, where, when to conduct the review and the usefulness of postoperative review in major gynaecological surgeries. We examine the current status of postoperative review and advice by reviewing the literature in relation to the gynaecological surgery.

**Keywords:** Gynaecological Surgery or Procedures, Hysterectomy, Laparoscopic Hysterectomy, Vaginal Hysterectomy, Abdominal Hysterectomy, Pelvic Organ Prolapse Surgery, Convalescence Advice, Activity Restriction, Post-Operative Review/Care/ Rehabilitation, Sexual Intercourse, Driving, Return to Work, Weight Lifting.

## Introduction

Postoperative advice and review following discharge is an important aspect of surgical management but recently, its significance has finally been questioned. In the last decade, the focus of post-operative care research seems to be on how to optimise the period of immediate postoperative recovery during hospitalisation. Many prospective studies were carried out to evaluate different approaches to postoperative pain control [1], time of feeding [2], prophylaxis of deep venous thrombosis [3], use of nasogastric tubes [4] and prophylaxis of nausea and emesis [5]. While there is an expanding base of evidence to inform modern guidelines for acute postoperative care, no consistent evidence from clinical studies or Cochrane database review is available regarding convalescence following major gynaecological procedures. Postoperative care seems fragmented and poorly coordinated and current recommendations for activity after discharge remain based on tradition and anecdote.

There seems to be a number of areas of controversies regarding convalescence advice following major uncomplicated gynaecological surgeries, including the lack of evidence for a 6-week recovery period post-hysterectomy, the period of time patients have to refrain from driving, working or sexual activities, etc. These controversies led to substantial variability in convalescence advice given by different healthcare parties following gynaecological surgeries. This contributes to irrational beliefs and delayed or avoidance of resumption of activities, leading to prolonged sick leave which has an

enormous financial implication. Currently, women comprise at least 50% of the workforce in most post-industrial societies [6]. The economic impact of their absence from work is enormous with an estimated loss of 16.8 billion pounds [7]. 1 extra day of sick leave given to patients has a direct cost of approximately 34 million pounds annually to the NHS. Prolonged absence from work also results in work disability, poorer general health and increased risk of mental health problems [8], leading to a lower quality of life.

This article aims to review the current evidence base, guidelines and practice for common convalescence advice related to physical activity, driving, sexual intercourse, resumption of household responsibilities and return to work outside the house; given following common uncomplicated gynaecological surgical procedures. The advantages and disadvantages of different types of review methods would also be discussed. In addition, we include suggestions on how best to utilise the base of evidence to design an optimal convalescence model. Finally, recommendations regarding the most optimal post-operative advice and review methods would be suggested.

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## Methods

We performed a medline search using the Mesh terms: Female, Gynaecological Surgery or Procedures, Hysterectomy, Laparoscopic Hysterectomy, Vaginal Hysterectomy, Abdominal Hysterectomy, Organ Prolapse Surgery, Convalescence Advice, Activity Restriction, Post-Operative Review/Care/ Rehabilitation, Sexual Intercourse, Driving, Return to Work, Weight Lifting.

We also reviewed clinical guidelines regarding convalescence after major gynaecological surgeries from different parts of the world, including the Royal College of Obstetricians and Gynaecologists of the United Kingdom [9], American guidelines based on the Medical Disability Advisor [10-12] and the Dutch guideline derived from Modified Delphi study [13].

In general, gynaecological operations were separated into major or minor procedures. Major surgery involves opening up major body cavities, in this case, the abdomen and pelvis, either via laparotomy or laparoscopic approach. These procedures include hysterectomies, repair for pelvic organ prolapses, etc, and are usually carried out under general or central neuraxial blockade in a hospital theatre room by a team of gynaecologists and a stay of at least 1 night in the hospital is usually needed.

Minor surgery, on the other hand, refers to procedures in which major body cavities are not opened. Examples include hysteroscopy, endometrial ablation, colposcopy, surgical management of miscarriage, etc. These procedures are often performed using local or central neuraxial blockade and may be carried out in the emergency department, an ambulatory surgical centre or a doctor's office by a single doctor. Vital organs are usually not stressed and patients can be discharged on the same day of operation. For the purpose of this paper, we will be focusing on major uncomplicated gynaecological surgeries in otherwise healthy patients without any other major problems (i.e. no comorbidity, psychosocial problems or obstacles other than medical for recovery or resumption of work).

Major gynaecological procedures can be further classified into procedures for benign or malignant conditions. The most frequently performed major surgical procedures for a benign indication in gynaecology are diagnostic laparoscopy, laparoscopic adnexal surgery, surgery for organ prolapse (pelvic floor repair operation, mid-urethral sling operation for stress urinary incontinence) and the 4 surgical approaches of hysterectomy: abdominal hysterectomy (AH), vaginal hysterectomy (VH), total laparoscopic/ laparoscopic-assisted (TLH/LAVH) and laparoscopic supracervical hysterectomy (LSH).

Gynaecological operations for malignant conditions are further divided into simple versus complex surgery. Simple surgery was defined as benign low risk adnexal surgery or simple type 1 hysterectomy where ureteric dissection was not formally performed. All surgeries where pelvic sidewalls were formally dissected were classified as 'complex'.

## Current Guidance

The Royal College of Obstetricians and Gynaecologists (RCOG) advises patients with malignant pathology to be routinely reviewed 2 weeks postoperatively and then regularly thereafter, whilst those patients with benign pathology are recommended to be reviewed in 2 to 4 weeks post-operation.

In the UK, convalescence advice and sickness certification following surgery for major gynaecological surgeries are based on the 'Recovering Well' guidelines derived from the Royal College of Obstetricians and Gynaecologists (RCOG) [9] in partnership with the Department for Work and Pensions (DWP) [13]. These recommendations are solely derived from anecdotal experience and the 2002 directive from DWP on major and laparoscopic surgical procedures; they are hence very variable and are non-specific to the types of gynaecological procedures, leading to considerable inconsistency in the advice given to patients regarding duration of absence from work [6].

In the United States, convalescence advice was based on another set of guidelines from Medical Disability Advisor [10-12] and in the Netherlands, the Dutch guideline was derived from Modified Delphi study [13].

When comparing the Dutch recommendations from the Delphi study to the American MDA guidelines, it is striking that for all types of hysterectomy and job classification, at least 2-6 weeks less sickness leave was advised in the Dutch guidelines. This is possibly due to the fact that the two guidelines were developed for different purposes. The guidelines derived from the Delphi study was developed as an aid for gradual resumption of activities after major gynaecological surgeries, whereas the DMA disability guidelines were designed to determine the duration of sickness benefit, therefore they set out important points in time after which, if full recovery has not occurred, additional evaluation should take place. Also, the Delphi study is the only study that provided detailed advice of different types of graded activities from the day of surgery until a full return to work, whereas the DWP and DMA guidelines only report the recovery time until a full return to work (Table 1).

## Discharge

Criteria for safe discharge include the patient, adequately mobilising without assistance, tolerating early oral feeding, having pain and discomfort controlled by oral analgesia and having adequate home supervision after discharge.

## Evidence base for current practice

In conventional surgical care, most patients are admitted to hospital the day before planned surgery to undergo preoperative mechanical and antibiotic bowel preparation together with Intravenous (IV) hydration therapy to optimise their fluid balance prior to surgical or anaesthetic insults. Post-operatively, these patients would be kept nil by mouth for 2 to 3 days before being commenced on a graduated diet of clear liquids, free fluids, light diet and finally a regular diet. Patients would usually be discharged 5 to 7 days post-operation [14].

Laparoscopic Adnexal Surgery	Guidelines			
	RCOG + DWP <sup>9</sup> (UK)	MDA		Delphi
	(Weeks)	(US)		(Dutch)
	2	Sedentary	Physically demanding	3
		1	3	
LSH	3	4	10	4
TLH/ LAVH				
VH	4 - 6	4	10	4 - 6
AH	7	6	12	6
Organ prolapse	3 - 4	/		/
Comment	Recovery time to full return to work provided (Regardless of the nature or physical taxation of the job)	Minimum, optimum and maximum length of disability was provided according to the demand of the job		Detailed advice of different types of graded activities from the day of surgery until a full return to work was provided

**Table 1:** Post-operative recovery times in weeks (to full activity) for different major gynaecological surgeries recommended by guidelines from different countries.

DWP: Department for Work and Pensions (UK), MDA: Medical Disability Advisor (US), Delphi: Modified Delphi Method (Dutch), Lap Adn: laparoscopic adnexal surgery, LSH: laparoscopic supracervical hysterectomy, TLH/ LAVH: total laparoscopic hysterectomy/ laparoscopic assisted vaginal hysterectomy, VH: vaginal hysterectomy, AH: abdominal hysterectomy.

In the past few years, Fast Tract Surgery (FTS) or Enhanced recovery programmes have been developed and adopted by many specialties with documented improved patient outcomes and reduced length of stay (LOS). In an FTS programme, patients would be made aware that their anticipated LOS. TED Stocking and Clexane 20-40mg would be given perioperatively. There would be limited use on equivalent of narcotic analgesia and pain-relief is achieved with a combination of intraoperative coxibs and transverse abdominis plane block. Early oral feeding, initially with oral liquids would be commenced on the night of surgery and patients would be allowed on light diet day 1 post-op, with rapid progression thereafter. Patients would be encouraged to mobilize; catheters and IV fluids would be removed on day 1 post op.

An Australian study of 242 patients undergoing laparotomy for both benign and malignant gynaecological conditions, demonstrated that 1 in 3 patients could be discharged on day 2 post-surgery without an increased morbidity or readmission rate [15]. Several other studies also emphasised the importance of accelerated rehabilitation on recovery in gynaecologic oncology patients undergoing surgeries [16,17] Early discharge did not appear to be restricted to simple surgical cases in thin women, who have had transverse incisions. Interestingly, Carter et al showed that 74% of patients discharged on day 2 post-operation had complex procedures performed and vertical midline incisions while 44% were considered overweight or obese [15]. Chase and colleagues reported the largest series of gynaecologic surgical patients (N=880) treated by a standard clinical pathway which encompasses some but not all of the elements essential to a FTS programme. They found that younger age, lower BMI, lower EBL at surgery and a post-operative diagnosis of benign ovarian neoplasm and non-radical dissection are associated with an early discharge [19].

Generally, vaginal and laparoscopic surgeries are associated with shorter post-operative hospitalisation when compared to laparotomy. A French study investigating convalescence

recommendations after incontinence and pelvic organ prolapse surgery demonstrated that the expected postoperative hospital stay was median 3 days (range, 3-4) following surgery by vaginal route or laparoscopic sacral colpopexy and 5 days (range, 4-6) following laparotomy (P<0.0001) [41]. However, in light of the encouraging results achieved with FTS laparotomy [ 18, 19], the perceived benefits of laparoscopic surgery might become questionable.

## Recommendations

### Post-operative advice

#### A) Evidence base for current post-operative advice

Apart from the modified Delphi study carried out by [13], literature review revealed no other studies that evaluated detailed convalescence recommendations after major gynaecological surgeries. Current clinical practices regarding post-operative advice after major gynaecological procedures are highly variable and recommendations are on evidence based traditions and personal opinions rather than research evidence. A French study investigating convalescence recommendations after incontinence and pelvic organ prolapse surgery, pointed out that the great variance in post-operative advice might be due to surgical experience, rather than demographic differences between gynaecologists (male/female, private or public hospital, urologist/gynaecologist) [41].

### Incision care

Transvaginal gynaecological procedures, including pelvic reconstructive and incontinence surgery, have been shown to result in lower patients' morbidity when compared to those performed transabdominally. The physiologic surgical wound-healing process in the abdomen and vagina is a major determinant of post-operative recovery.

Several inherent tissue characteristics have been thought to

influence wound healing rates in the vagina and the abdomen. Wound healing is mediated by inflammation, blood clot formation and neovascularisation [22]. Firstly, the vagina is a highly vascularised organ [23], theoretically, it should have fast wound-healing rate. Secondly, the vagina is lined by non-keratinised epithelium in contrast to the keratinised epithelium in skin; this might contribute to the different wound-healing properties between the two tissues. Thirdly, different concentrations of growth factors, e.g. transforming growth factor [24], fibroblast growth factor [25] and platelet-derived growth factor [26] in the abdomen versus vagina may also play a role in determining the rate of wound healing.

Environmental factors have also been implicated to affect wound healing. Exposure to air has been shown to slow down the wound's early epithelial migration [27], while a moist environment seems to encourage wound healing [28]. Vaginal wounds are generally situated in a moist environment with minimal exposure to air when compared to abdominal ones, it is reasonable to assume that wounds in vagina heal faster than those in the abdomen. Another point to note is that the bacterial flora differs substantially between the vagina and skin, this feature may also affect wound healing between these tissues.

Despite extensive research in the wound healing process in major organs [29, 30], biomechanical properties and hence wound healing of the vagina has not been thoroughly investigated. Abramov and colleagues was the first to demonstrate that surgical wounds close and contracts faster in the vagina than in the abdomen using a rabbit model [31]. Baseline tensile strength ( $P=0.05$ ) and tensile energy to break ( $P=0.18$ ), which reflect the ability of the wound to resist distractive forces, were found to be higher in the abdomen, whereas maximal tissue elongation, in indicator of tissue elasticity, was higher in the vagina ( $P = 0.13$ ). Interestingly, despite these fundamental differences in biochemical properties between the vagina and abdominal skin, changes in these properties occur at a similar rate in both tissues. After wounding, a drop in tensile strength and tensile energy to break was observed in both tissues through post-wounding day 4, followed by a progressive recovery of these properties. The abrupt decline in overall tissue strength of a wound occurs during the inflammatory phase suggesting that the risk of wound failure is greatest during the acute post-wounding phrase. This is an important piece of information to bear in mind when offering post-operative advice regarding incision care and activity restriction. Subsequent increase in tensile strength occurs during rapid proliferation of fibroblasts and collagen deposition, leading to scar formation [32]. A progressive loss of elasticity was also noted in both tissues after wounding. This might suggest the relevance of enquiring

about related symptoms, e.g. dyspareunia during post-operative reviews.

## 2. Diet

Additional protein-enriched supplements taken for 10-16 weeks following discharge after abdominal surgery has been shown to increase body weight and lean body mass, however, their effect on recovery, hand grip strength and quality of life could only be demonstrated in patients who are protein-depleted postoperatively [33, 34]. These findings suggest that prolonged nutritional therapy has no major benefit except in depleted patients.

## 3. Activities

### i) Physical Activities (Light/ Moderate/ Heavy)

Many surgeons recommend rest and activity restriction to their patients post-operatively. Rest may be helpful in terms of pain control and minimising post-operative fatigue. However, there is now a body of evidence suggesting that early resumption of activity post-injury promotes restoration of function while prolonged rest delays recovery [35]. Therefore, questions about post-operative activity now pertain less to rest but rather focus on which specific activities should be avoided.

Current post-operative guidelines on activity restriction are not evidence-based but are developed by surgeons based on an intuition about which activities excessively raise the intraabdominal pressure (IAP) and also from anecdotal evidence. Nygaard et al summarized literature related to the degree of rise in IAP during various activities [36]. Interestingly, they demonstrated the range of IAP during specific activities is large, i.e. if one was to use the same method to measure IAP in women who were told to do the same standardized activity, the IAP in one woman may be very low and in another very high. They also found that IAPs during activities often restricted after surgery (e.g. heavy lifting) and those generally not restricted (e.g. climbing stairs) overlap considerably. These findings suggested that IAP is not a good indicator when determining the need for activity restriction during the convalescence period. (Table 2)

Up to date, there has been no randomised controlled trial or prospective cohort study investigating the association between post-operative activity and long-term surgical success [36]. The balance of activity to optimally support and maintain pelvic floor function after gynaecological surgical interventions has yet to be elucidated. Below, we summarized literature that we identified relating to activity restriction after major gynaecological procedures as shown in the tables 3-9.

Medically possible (d/wks post-op)	Major gynaecological surgeries						
	Lap Adn	LSH	TLH	VH	AH	Organ prolapse	
2d	Light	x	x	x	x	-	-
1wk	Moderate	Light	Light	x	x	-	-
2 wks	Heavy	Moderate	Moderate	Light	Light	-	-
3 wks	Resumption of average job	Heavy	Heavy	Moderate	Moderate	-	-
4 wks		Resumption of average job	Resumption of average job	Heavy		-	-
6 wks				Resumption of average job	Resumption of average job	Resumption of average job	Heavy + resumption of average job
Activity level	Type of activities						
	Lifting/ carrying weights	Sustained sitting	Sustained standing and walking	Pushing/ pulling weights	Riding a bicycle	Vacuum cleaning	Working 8hrs/d
Light	5 kg	2 hours	30 mins	x	x	x	x
Moderate	10kg	2+ hours	4 hours	15kg	√	x	x
Heavy	15kg		Entire day	15+ kg	√	√	x
Resumption of average job	15+ kg	√			√	√	

**Table 2:** Summary of convalescence recommendations in terms of activity restriction regarding major gynaecological operations from Delphi study.

**Table 3:** Summary of convalescence recommendations regarding light activities after major gynaecological operations obtained from different studies.

Studies	Major gynaecological surgeries						
	Dx Lap	Operative Laparoscopy			Vaginal surgery		AH
		Lap Adn	LSH	TLH	VH	Organ prolapse	
N= 406 Survey [42]	Median: 2d IQR: 2d Q1-Q3: 1d-3d	Median: 3d IQR: 6d Q1-Q3: 1-7d			Median: 7d IQR: 12d Q1-Q3: 2-14d		Median: 7d IQR: 11d Q1-Q3: 3-14d
Dutch multidisciplinary convalescence recommendations derived from Modified Delphi study among 12 experts and 63 medical doctors + literature review [13]	-	2d*	1wk*	1wk *	2wks*	-	2wks*
RCOG, 2010	As soon as possible	As soon as possible			1-2wks		1-2 wks
Danish, N=665, postal questionnaire [37]	-	-	This study provided generalised results for hysterectomised patients: Lifting restrictions varied from lifting max of 15kg for 2 wks to max of 2 kg for 12 wks			-	Same as described previously
Danish, prospective study of 41 female patients after vaginal prolapse surgery in a fast-track setting using a multimodal rehabilitation model with well-defined recommendations for convalescence [38]	-	-	-	-	Median conva lescence: <1wk (1 yr subjective recurrence rate: 17%)		-

Survey of 355 Danish gynecologists regarding postoperative treatment and convalescence recommendations following vaginal repair [39]	-	-	-	lifting restrictions: median 3 kg (range, 0-20) for median 4 ks (range, 1-12); convalescence for non-strenuous activities median 1-2 wks (range 0-24)	-
Japanese retrospective survey of 194 patients discharged after laparoscopic surgery to investigate the recovery of ADL 1 month after surgery [40]	-	The mean (95% CI) of days (disease day) before the subjects could do ADL for the first time after surgery was 5.4 (4.5-6.3) for housekeeping, 5.6 (4.7-6.5) for shopping,		-	-

IQR= interquartile range (Middle spread or middle 50%)

Q1-Q3= Quarter 1 to Quarter 3

\*reaching out, turning, twisting, kneeling, squatting, sustained sitting <2 hours, lifting/carrying weights <5kg, sustained standing and walking <30minutes

**Table 4:** Summary of convalescence recommendations regarding moderate activities after major gynaecological operations obtained from different studies.

Studies	Major gynaecological surgeries						
	Dx Lap	Operative Laparoscopy			Vaginal surgery		AH
		Lap Adn	LSH	TLH	VH	Organ prolapse	
N= 406 survey [42]	Median: 4d IQR: 6d Q1-Q3: 1d-7d	Median: 7d IQR: 5d Q1-Q3: 2-7d			Median: 28d IQR: 35d Q1-Q3: 7-42d		Median: 28d IQR: 29d Q1-Q3: 13-42d
Danish, prospective study of 41 female patients after vaginal prolapse surgery in a fast-track setting using a multimodal rehabilitation model with well-defined recommendations for convalescence [38]	-	-	-	-	Median convalescence: <2wks (1 yr subjective recurrence rate: 17%)	-	
Dutch multidisciplinary convalescence recommendations derived from Modified Delphi study among 12 experts and 63 medical doctors + literature review [13]	-	1wk*	2wk*	2wk*	3wk*	-	3-4wk*
FitzGerald et al, 2001, survey of 287 gynaecologic surgeons	-	-	-	-	88-99% restricted lifting for a mean of 5-7 wks (range 1-26 wks and up to “forever” after VH + Vaginal repair) 20% restricted stair climbing		-
A survey of 76 French urologists and gynaecologists about postoperative treatment and convalescence recommendations following stress urinary incontinence and pelvic organ prolapse surgery [41]	-	Laparoscopic sacral colpopexy (lifting restriction)		-	-	-	
		Low-experienced surgeons median 6 wks (range 4-10)	high-experienced surgeons median 4 wks (range 2-8)				

Japanese retrospective survey of 194 patients discharged after laparoscopic surgery to investigate the recovery of ADL 1 month after surgery [40]	-	The mean (95% CI) of days (disease day) before the subjects could do ADL for the first time after surgery was 11.6 (10.1-13.2) for bathing, 11.8 (10.2-13.5) for bicycle riding, 12.8 (11.6-13.9) for light exercise	-
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\*bending, pushing/ pulling weights <15kg, lifting/ carrying weights <10kg, sustained standing and walking <4 hours, sustained sitting >2 hours, climbing stairs, prolonged kneeling/squatting/twisting, taking a bath, riding a bike

**Table 5:** Summary of convalescence recommendations regarding heavy activities after major gynaecological operations obtained from different studies

Studies	Major gynaecological surgeries						
	Dx Lap	Operative Laparoscopy			Vaginal surgery		AH
		Lap Adn	LSH	TLH	VH	Organ prolapse	
N= 406, survey [42]	Median: 7d IQR: 11d Q 1 - Q 3 : 2d-13d	Median: 14d IQR: - Q1-Q3: -			Median: 42d IQR: 35d Q1-Q3: 21-56d		Median: 42d IQR: 28d Q1-Q3: 28-56d
RCOG	-	-	-	-	3-4 wks	4-6 wks	3-4wks
Danish, prospective study of 41 female patients after vaginal prolapse surgery in a fast-track setting using a multimodal rehabilitation model with well-defined recommendations for convalescence [38]	-	-	-	-	-	Median convalicence for sports + lifting weights >10kg: <4wks (1 yr subjective recurrence rate: 17%)	-
Dutch multidisciplinary convalescence recommendations derived from Modified Delphi study among 12 experts and 63 medical doctors + literature review [13]	-	2wk*	3wk*	3wk*	4wk*	-	6wk*
Survey of 355 Danish gynecologists regarding postoperative treatment and convalescence recommendations following vaginal repair [39]	-	-	-	-	-	median 4-5 wks for strenuous activities	-
Japanese retrospective survey of 194 patients discharged after laparoscopic surgery to investigate the recovery of ADL 1 month after surgery [40]	-	The mean (95% CI) of days (disease day) before the subjects could do ADL for the first time after surgery was 18.1 (15.0-21.2) for sport activities			-	-	-

\*jumping, standing per day, walking per day, bending frequently, lifting/ carrying weights <15kg, pulling weights <15kg, sustained standing and walking during the entire day, vacuum cleaning

**ii) Sexual Intercourse**

**Table 6:** Summary of convalescence recommendations regarding sexual intercourse after major gynaecological operations obtained from different studies.

Studies	Major gynaecological surgeries						
	Dx Lap	Operative Laparoscopy			Vaginal surgery		AH
		Lap Adn	LSH	TLH	VH	Organ prolapse	
N= 406, survey of GP, gynaecologists [42]	Median: 7d IQR: 5d Q1-Q3: 2d-7d	Median: 14d IQR: 10d Q1-Q3: 4-14d			Median: 42d IQR: 14d Q1-Q3: 28-42d		Median: 42d IQR: 14d Q1-Q3: 28-42d
RCOG	Patient feels ready	Patient feels ready			4-6 wks		4-6 wks
Danish, N=665, postal questionnaire of gynaecologists, GP [37]	-	-	This study provided generalised results for hysterectomised patients: Median: 4 wks (range: 0-12 wks)		-	-	Same as described previously
Danish, prospective study of 41 female patients after vaginal prolapse surgery in a fast-track setting using a multimodal rehabilitation model with well-defined recommendations for convalescence [38]	-	-	-	-	-	Median convalescence: <4wks (1 yr subjective recurrence rate : 17%)	-
Dutch multidisciplinary convalescence recommendations derived from Modified Delphi study among 12 experts and 63 medical doctors + literature review [13]	-	-	-	6wk	-	-	-
FitzGerald et al, 2001, survey of 287 gynaecologic surgeons	-	-	-	-	99% restricted intercourse for a mean of 5.8 wks (range 2-12 wks)	Burch urethropexy: 87% restricted intercourse for a mean of 5.8 wks (range 2-12wks)	Same as VH
A survey of 76 French urologists and gynaecologists about postoperative treatment and convalescence recommendations following stress urinary incontinence and pelvic organ prolapse surgery [41]	-	-	The recommended time till recommencement of sexual intercourse was median 4 weeks (range, 2-12) following laparoscopic sacral colpopexy.		-	-	-
Survey of 355 Danish gynecologists regarding postoperative treatment and convalescence recommendations following vaginal repair [39]	-	-	-	-	-	recommended time till recommencement of sexual intercourse was median 4 weeks (range, 0-12)	-

### iii) Driving

**Table 7:** Summary of convalescence recommendations regarding driving after major gynaecological operations obtained from different studies.



Studies	Major gynaecological surgeries						
	Dx Lap	Operative Laparoscopy			Vaginal surgery		AH
		Lap Adn	LSH	TLH	VH	Organ prolapse	
N= 406, survey [42]	Median: 4d IQR: 6d Q1-Q3: 1d-7d	Median: 7d IQR: 12d Q1-Q3: 2-14d			Median: 28d IQR: 21d Q1-Q3: 21-42d		Median: 42d IQR: 14d Q1-Q3: 28-42d
RCOG	Emergency stop is achievable	Emergency stop is achievable			2-4 wks		3-6 wks
Analysis of 10 hysterectomy patient information leaflets [43]	-	-			-		4 wks (N=9), able to stamp feet hard (N=1), able to do emergency stop + consult vehicle insurer before driving (N=2), no advice (N=1)
Dutch multidisciplinary convalescence recommendations derived from Modified Delphi study among 12 experts and 63 medical doctors + literature review [13]	-	-	-	1wk	-	-	-
FitzGerald et al, 2001, survey of 287 gynaecologic surgeons	-	-	-	-	90% restricted driving for a mean of 2-3 wks		
Survey of 68 O&G consultants and SpR in Northern Ireland [44]	-	14.7%: as soon as they want/ comfortable 29.4%: as soon as they can do emergency stop 10.3%: 1 wk 11.8%: 6 wks			-	25%: as soon as they can do emergency stop 14.7%: 4-5 wks 39.7%: 6 wks	7.4%: as soon as they want/ comfortable 19.1%: as soon as they can do emergency stop 8.8%: 3 wks 50%: 6 wks

**iv) Return to work and normal activities**

**Table 8:** Summary of convalescence recommendations regarding return to work after major gynaecological operations obtained from different studies

Studies	Major gynaecological surgeries						
	Dx Lap	Operative Laparoscopy			Vaginal surgery		AH
		Lap Adn	LSH	TLH	VH	Organ prolapse	
N= 406, survey [42]	Median: 7d IQR: 5d Q1-Q3: 2d-7d	Median: 10d IQR: 9d Q1-Q3: 5-14d			Median: 42d IQR: 28d Q1-Q3: 28-56d		Median: 42d IQR: 14d Q1-Q3: 42-56d
RCOG	1 wk	2-3 wks			4-6 wks	3-4 wks	6-8wks

Dutch multidisciplinary convalescence recommendations derived from Modified Delphi study among 12 experts and 63 medical doctors + literature review (resumption of average job) [13]	-	2wk	3wk	3-4wk	4wk	-	6wk
N=87 [43]	-	-	-	-	-	-	Office work- Median 6-8 wks (range: within 3 wks to 9-12 wks) Moving and handling – 9-12 wks (range: within 3 wks to over 12 wks)
Danish, N=665, postal questionnaire [37]	-	-	This study provided generalised results for hysterectomised patients: Office work Median: 4 wks (range: 1-8 wks)		-	-	Same as described previously
			Manual handling Median: 6 wks (range: 2-12 wks)				
American Disability Advisor guidelines			Sedentary work: 4 wks		-	-	Sedentary work: 6 wks
			Physically demanding jobs: 10 wks				Physically demanding jobs: 12 wks
A survey of 76 French urologists and gynaecologists about postoperative treatment and convalescence recommendations following stress urinary incontinence and pelvic organ prolapse surgery [41]	-	-	-	-	-	Recommended sick leave was median 4 wks (range, 2-8) following pelvic organ prolapse surgery	-
Survey of 355 Danish gynecologists regarding postoperative treatment and convalescence recommendations following vaginal repair [39]	-	-	-	-	-	Recommended sick leave was median 6 weeks (range, 2-12) for patients with work with heavy lifts	-

Retrospective study of 75 women in 2 West Midlands hospital regarding return to work following AH [43]	-	-	-	Only 81% given advice; Advice given ranged from 4-15 wks; Median sickness absence: 94d (89d where advice given vs 122d where no advice given)
Swedish randomised prospective study of short-term outcome of AH vs VH vs LAVH, N=120 [46]	-	Mean sickness leave: 19.7d	Mean sickness leave: 21.3d	Mean sickness leave: 28.1d
Japanese retrospective survey of 194 patients discharged after laparoscopic surgery to investigate the recovery of ADL 1 month after surgery [40]	-	The mean (95% CI) of days (disease day) before the subjects could do ADL for the first time after surgery was 12.5 (11.4-13.7) for office work, 16.0 (13.7-18.3) for physical work	-	-
Prospective observational study in Netherlands of duration of sick leave in 46 women who have undergone elective gynaecologic surgery [47]	50% returned to work after 8 wks, 30% resumed work partly, 20% did not resume work at all. Postoperative recovery-specific quality-of-life questionnaire, the Recovery Index (RI-10), the RI-6 (a subset of 6 questions) when measured 2 weeks after surgery showed the best discriminative capacity to predict sick leave after 8 weeks, with an area under the curve of 0.88 (confidence interval, 0.74-1.03)			
Dutch prospective cohort study of 148 women scheduled for gynaecological surgery for benign indications to measure time to return to work (RTW) and most important predictors for prolonged sick leave after surgery [48]	Median time to RTW was 7 days (interquartile range [IQR] 5-14) for diagnostic surgery, 14 days (IQR 9-28) for minor surgery, 60 days (IQR 28-101) for intermediate surgery and 69 days (IQR 56-135) for major surgery. Multivariable analysis showed a strongest predictive value of RTW 1 year after surgery for level of invasiveness of surgery (minor surgery hazard ratio [HR] 0.51, 95% CI 0.32-0.81; intermediate surgery HR 0.20, 95% CI 0.12-0.34; major surgery HR 0.09, 95% CI 0.06-0.16), RTW expectations before surgery (HR 0.55, 95% CI 0.36-0.84), and preoperative functional status (HR 1.09, 95% CI 1.04-1.13). A prediction model regarding the probability of prolonged sick leave at 6 weeks was developed, with a sensitivity of 89% and a specificity of 86%.			

LAVH = laparoscopically assisted vaginal hysterectomy

ADL: activity of daily living

**Table 9:** Summary of convalescence recommendations regarding return to normal activities after major gynaecological operations obtained from different studies

Studies	Major gynaecological surgeries						
	Dx Lap	Operative Laparoscopy			Vaginal surgery		AH
		Lap Adn	LSH	TLH	VH	Organ prolapse	
N= 406, survey [42]	Median: 7d IQR: 5d Q1-Q3: 2d-7d	Median: 14d IQR: 9d Q1-Q3: 5-14d			Median: 42d IQR: 28d Q1-Q3: 28-56d		Median: 42d IQR: 14d Q1-Q3: 42-56d
RCOG	2 wks	2 wks			2-24 wks		1-24 wks

Danish, postal questionnaire of 188 female patients [38]	-	-	-	Vaginal prolapse: Median 6 months (range: 1-12 months), recurrence rate 22% within median 6 months (range 0-24 months)	-
Cochrane review of RCTs comparing 3 approaches to hysterectomy for AH, VH and LH (34 studies, N = 4495) [49]	-	-	No difference between speed of return to normal activities in LH vs VH groups	-	-
			VH has speedier return to normal activities than AH (mean difference: 9.5 d)		
			LH has speedier return to normal activities than AH (mean difference 13.5d)		

**B) Recommendations**

Generally, convalescence period is shorter following laparoscopic gynaecological procedures when compared with abdominal or vaginal surgery. The longer convalescence following abdominal and vaginal surgery is related to concerns regarding the potential risk of wound dehiscence and recurrence of prolapse [37]. However, recent study findings disapproved of the above mentioned concerns. Minig et al demonstrated the pressures required to cause wound dehiscence far exceeds those created under normal physiological conditions [6]. Furthermore, Nygaard et al also suggested that intraabdominal pressure is not a good indicator to determine need for activity restriction during the convalescence period [36].

Recommendations regarding resumption of sexual activity after major gynaecological surgeries seem to be quite confusing. Rather than stating a specific period of time in which intercourse restriction should be observed, some gynaecologists tend to give additional conditional advice which are not evidence-based, e.g. “when comfortable”, “when patient feels right”, “when

Medically possible (d/wks post-op)	Major gynaecological surgeries						
	Dx Lap	Operative Laparoscopy			VH	AH	Organ prolapse
		Lap Adn	LSH	TLH			
asap	Light	Light			x	x	-
1-2 wks	Return to work	/			Light	Light	Light
2-3 wks	Return to normal activities	Return to work			/	/	/
3-4 wks	-	Return to normal activities			Heavy	Heavy	Return to work
4-6 wks	-				Return to work	/	Heavy
6-8 wks	-				/	Return to work	/
Others	-				Return to normal activities (2-14 wks)	Return to normal activities (1-14 wks)	Return to normal activities (1-14 wks)

**Table 10:** Summary of convalescence recommendations in terms of activity restriction regarding major gynaecological operations from RCOG guidelines.

bleeding stops”, etc. The main concern regarding resumption of intercourse is probably the risk of uterine or vault infection and vault dehiscence. Intercourse was identified by Ceccaroni et al to be a trigger factor for development of vaginal vault dehiscence in 20% of patients [38]. Vault dehiscence occurred between 1-62 months post-surgery, with most cases (72%) occurring within 6 months following surgery. Other than sexual intercourse, many other factors have been implicated to cause wound dehiscence, e.g. postoperative infection, haematoma, age, poor surgical technique, previous trauma or rape, previous vaginoplasty, use of Valsalva, corticosteroid therapy and radiotherapy [39]. It is important to bear in mind that the prevalence of vaginal vault dehiscence after hysterectomy is very low (0.80% after laparoscopic hysterectomy, 0.25% after abdominal hysterectomy and 0.15% after vaginal hysterectomy). Currently, there are still no studies carried out to determine the optimal period after which woman can resume sexual intercourse after major gynaecological procedures. (Table 6)

Similar to convalescence advice on sexual intercourse, some gynaecologists tend to offer conditional advice regarding driving after gynaecological surgeries, which can sometimes be quite misleading. These include “checking with insurance company” and “ensuring one is able to perform an emergency stop without discomfort”. According to Darwood [41] who contacted 25 insurance companies about return to driving following varicose vein surgery, they found that insurance companies mostly do not have a pre-set protocol to follow when giving driving advice; instead they tend to advise drivers to follow the advice of doctors. In the UK, according to the Driver and Vehicle Licensing Agency (DVLA), drivers do not need to notify the DVLA unless they suffer from a chronic medical condition (persistent for >3 months) which is likely to affect safe driving [40]. Therefore, patients who wish to return to driving after major gynaecological procedures should establish with their own GP or gynaecologists when it is safe to do so [54]. When making decisions regarding driving resumption, several issues should be taken into account, e.g. recovery from surgical procedure, the distracting effect of pain, effect of sedation and cognitive impairment relating to analgesia use, physical restriction due to surgery and underlying co-morbidities.

The multimodal rehabilitation model designed by Ottesen et al seems to be a good model for determining convalescence advice following vaginal prolapse surgery [38]. Their model focused on provision of effective analgesia and sufficient oral nutrition to reduce post-operative pain and fatigue so that non-restrictive physical activities could be encouraged during convalescence. Results were promising and showed quicker convalescence and hence reduction in sick-leave without increasing the risk of recurrent prolapse in the short term.

## Post-operative review

### Evidence base for current methods of post-operative review

There are several methods to carry out post-operative review.

Traditionally, patients were always reviewed in outpatients' clinics via a face-to-face approach, 4-6 months following gynaecological surgeries, depending on the type of surgery performed. Over the past decade, telephone review has been slowly developed as the more flexible and convenient alternative to clinical review. With rapid advancement in technology, smart phones are widely available now with clever social media tools (e.g. facebook, skype, etc) that enable instant effective communication amongst people in different parts of the world. These social media tools might facilitate telemonitoring of patients during convalescence.

### 1) Telephone review vs Face-to-face clinical review

Telephone services are defined as non-face-to-face evaluation and management services provided by a healthcare provider to a patient using the telephone. This method of communication has become an increasingly important in the practice of medicine. It has been used in the management of asthma, diabetes, epilepsy, rheumatology, oncology, etc [41]. Telephone consultation has become more formalized over time, evolving from direct phone contact with the physician, telephone answering services, to specific telephone triage systems. Currently, both doctor and nurse-led triage services are widely used in emergency departments and general practice [56, 44].

#### a. Advantages of Telephone review over Face-to-face clinical review

Several studies have shown that patients are generally satisfied with telephone communication [60]. They reported benefits such as less waiting time, possibility to increased contact frequency with healthcare providers and less time spent on travelling to hospitals or medical centres. Some patients also valued the fact that anonymity can remain hidden during telephone consultation. This can be a major advantage when reviewing gynaecology patients since patients often describe issues that are often very personal and of a sensitive subject, e.g. vaginal bleeding, discharge or problems related to sexual intercourse. On the other hand, clinicians also appear to appreciate the convenience and flexibility of conducting telephone reviews. This form of review also reduces unnecessary clinic appointments especially in patients who have undergone straightforward, simple procedures with a low risk of complications and are likely to be discharged at initial review. Short consultations not only frustrate patients, they also carry a high risk of non-attendance, thereby wasting valuable resources.

High patient satisfaction has been achieved with post-operative telephone review, suggesting that this service can adequately provide the reassurance and review patients expect [43]. Several studies [55, 44] involving patients who have undergone paediatric surgical procedures, including adenotonsillectomy, also demonstrated that post-operative telephone follow-up is safe, cost-effective and preferable to patients and their families. Telephone follow-up after day case surgery has also been proven to be successful in reassuring patients and managing potential early complications [45].

### **b. Disadvantages**

From a doctor's point of view, one of the limitations of telephone triage is the concern of missing a significant diagnosis due to lack of visual cues from the patients and inability to carry out physical examination [46]. Despite the advice from British Medical Association that telephone consultations when correctly conducted can be considered safe and acceptable practice, many doctors are still reluctant to provide such service due to perceived vulnerability to medical legal risks and lack of confidence in appropriately trained personnel [47]. Many women present with vague gynaecological complaints that even with good communication and visual cues, the correct diagnosis may still not be achieved. During a telephone consultation, the doctor cannot see, touch, smell, examine or investigate the patient, making it even harder to make an accurate diagnosis. Another issue with legality is in the way of confidentiality. It is quite easy for telephone consultation to occur at places where convenience takes priority at the expense of patient confidentiality [48].

According to feedback from triage nurses, other concerns raised regarding telephone consultation included environmental distraction, difficulty in taking a thorough history and gathering sufficient information from patients over the phone to make the best management recommendation, especially if the caller is frightened or anxious; inability of patients to adequately articulate their complex problem due to psychological distance and inappropriate documentation [49, 50]. Recently, concerns about allegations of negligence in the initial act of triage, nursing assessments and examinations have been brought to light [62].

These include failure to engage on the phone lines leading to delay of care, failure of answering nurse to recognize an issue that required immediate attention, etc. In a study of 12 emergency registered nurses who conducted telephone triage, Rutenberg observed inconsistent diagnoses using simulated calls [70]. A prospective study was carried out to assess the accuracy of telephone consultation compared with an in-office diagnosis in patients with vulvovaginal complaints [51]. The study demonstrated poor correlation between the two methods of consultation, suggesting that some problems cannot be addressed appropriately using telephone consultations. Interestingly, another study of telephone triage in an adolescent clinic's response to mock patients with pelvic pain showed that only 63% of triage staff offered appropriate advice [52]. Some conditions in patients following major gynaecological surgeries may progress very quickly, it is therefore important that all patients get the quickest most efficient care. Additionally, communication difficulty when telephone consulting elderly patients or patients with hearing difficulties has also been raised [60].

From the patient's perspective, telephone triage is sometimes thought to only facilitate the convenience of clinics by triage nurses while reducing patients' choices to request seeing or speaking to a specific doctor [70]. Some patients believe that telephone triage is a barrier to reaching their doctors since they

always have to go through triage nurses first before getting to see the doctor [53]. Other patients are dissatisfied with this method of service provision since they think doctors focused too much in efficiency and speed of service delivery rather than the quality of medical care [54].

In order to develop an effective medical telephone triage system, a large amount of resources must be involved in setting up the system, training staff and re-evaluating their performances. Using Western Australia [55] as an example, one can appreciate the huge cost and effort of multiple parties behind the establishment of a successful large-scale medical telephone triage system. Firstly, standard triage criteria have to be developed to guide the operation of the triage centre. Strenuous guidelines were also in place to inform recruitment of staff. Despite have been registered nurses, all staff have to receive 3 to 6 months of additional training to enable them to perform with respect to the triage standard performance criteria. It is vital for staff to have adequate clinical experience with clear lines of responsibility as triage protocols are not one-size-fits-all and definitely cannot replace clinical experience [56]. They also need to have effective communication skills to manage anxious callers [57]. Upon completion of training, the nurses have to be continuously re-evaluated for the key performance indicators that act as quality indicators for their ongoing performance.

### **2) Review using social media tools**

Whilst there are many studies performed on the role of telemonitoring in certain specialties e.g. obstetrics and cardiology, [13] is the first group to develop an eHealth intervention using intervention mapping protocol, aiming to empower gynaecological patients during the perioperative period to obtain timely return to work (RTW) and prevent work disability [58]. Literature search was performed to identify behavioural and environmental factors leading to prolonged sick leave. In addition, focus group discussions were carried out to identify patients' needs, attitudes and beliefs regarding postoperative recovery and resumption of work.

### **The main determinants of prolonged sick leave identified by Noordegraaf include:**

Lack of clarity in convalescence recommendations given by gynaecologists, general practitioners and occupational physicians leading to patient confusion and misunderstanding; lack of communication between different healthcare providers involved in the care of patients undergoing gynaecological surgeries during the perioperative and reintegration period; insecurity about postoperative symptoms, complications and delayed recovery and not knowing where and when to seek appropriate help.

As described above, prolonged recovery and RTW seem to be caused by counselling and communication deficiencies. Most of the interventions set up targeting the above shortcomings have been focused on healthcare professionals [59,60]. However, empowering patients to actively participate in their recovery and healthcare is equally if not more important [61, 62].

Patient empowerment refers to the enhanced ability of patients to actively understand and influence their own health status [63]. This is an important domain of post-operative care and should be emphasized on when delivery such services. It focuses on control in patients' experiences of health, disease and illness, as well as the roles of healthcare organisations, communities and the broader health care system [64, 65]. With advancement in technology, novel social media tools or eHealth interventions seem to be a promising way to facilitate patient empowerment by providing personalised education (e.g. detailed convalescence advice on resumption of work activities specific to the type of surgery performed, education on which complications need additional consultation) and enhancing communication between patients and healthcare providers, making it more efficient and equal [66-70]. Tailored E-health programmes, when compared with generic patient leaflets, are more intensively used [71, 72] and more effective in conveying key messages [73, 74], hence they have a greater impact on patient's behaviour [75-77]. They also enable information delivery to a large audience [78] via different multimedia channels at any time, place and pace that fit both the patient and the healthcare providers [79]. The intervention will be developed to be used without support and with minimal effort of care, therefore the cost of maintaining such system is relatively low [93]. However, a successful eHealth intervention requires intensive research to develop an optimal programme plan with impeccable design and also huge effort to facilitate adequate implementation and re-evaluation [80,81].

## B) Recommendations

Despite the widespread use and increasing dependence on telephone consultation, there is currently no evidence validating the safety and reliability of this type of review method compared with more traditional face-to-face clinical appointments regarding post-operative reviews following uncomplicated major gynaecological procedures. Although nurse-led telephone reviews have been shown to provide adequate post-operative reviews, is acceptable to patients, [82-90] cost-effective and reduces the number of unnecessary outpatient reviews, further research needs to be undertaken to authenticate the optimal system of communication and review during convalescence specifically in patients following gynaecological surgeries. With advancement in technology, E-health interventions and tele-monitoring [91-95] seems to be increasingly used in current medicine. Future studies are needed to directly compare the efficacy between E-health interventions and telephone or face-to-face clinical consultations.

## Conclusion

Post-operative outcomes and hence advice given and methods of follow up are hugely dependent on by several factors, including patient characteristics (e.g. age, weight, height, body mass index (BMI), performance status, etc) and hospitalisation details (e.g. procedure performed, type of incision (transverse vs midline), operating time, complexity of surgery (simple vs complex), intraoperative estimated blood loss (EBL), whether the patient has completed early oral feeding, etc.

This paper has highlighted the fact that there is inconsistency in the convalescence advice given to patients following major gynaecological conditions. More structured and evidence-based recommendation could potentially have huge economic benefits to the NHS. In order to determine the optimal staged convalescence advice, prospective observational studies are needed to establish the natural recovery and ability to return to different activities and work after different types of major gynaecological procedures. Further research also needs to be undertaken to authenticate the optimal system of communication and review during convalescence in patients following major gynaecological surgeries.

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