

Activity Restrictions After Gynecologic Surgery

Margaret G. Mueller, MD, and Kimberly Kenton, MD

Gynecologic surgeons have traditionally restricted the physical activity of postoperative patients. Minimally invasive surgery and enhanced recovery after surgery programs have contributed to decreased hospital stays and more expeditious recovery. In this narrative review, we review the current state of postoperative activity restrictions in gynecology and other specialties, the purported risks and potential benefits of postoperative activity, the available evidence to refute or support activity in the postoperative activity, and, finally, the potential benefit of added activity in the postoperative period.

(*Obstet Gynecol* 2024;00:1–5)

DOI: 10.1097/AOG.0000000000005501

Gynecologic surgeons have traditionally restricted the physical activity of their postoperative patients. Minimally invasive surgery and enhanced recovery after surgery (ERAS) programs have led to decreased hospital stays and quicker recoveries, calling these recommendations into question.¹ One concern has been the potential for increases in intra-abdominal pressure leading to adverse outcomes. However, even routine, necessary, everyday activities

can lead to increases in intra-abdominal pressure. For example, Weir et al² demonstrated that going from sitting in a standard-height chair to standing (a common activity) results in an increase in intra-abdominal pressure similar to lifting a 13-lb load from the floor. Many fields are re-evaluating postoperative activity restrictions, including general and orthopedic surgery. Orthopedic literature suggests that early resumption of activity actually promotes restoration of normal function.³ If we extrapolate this theory to pelvic surgery, it is possible that pelvic loading (through activity) may help promote tissue remodeling, thereby strengthening muscle and tissue, ultimately leading to improved surgical outcomes.

Numerous studies have evaluated surgical outcomes after pelvic organ prolapse (POP) surgery, and most contemporary literature continues to evaluate outcomes of surgical procedures that were first described 50–100 years ago.^{4,5} Although there have been some modern modifications to these surgical procedures (eg, route of access, suture and mesh choice), there has been little innovation in the actual procedures themselves. There is even less focus on innovative approaches to improve recovery after gynecologic surgery. Minimally invasive surgical approaches, ERAS, opioid-sparing analgesia, and same-day discharge have helped revolutionize gynecologic and POP surgical care, eliminating several barriers to surgery.^{1,3,6,7} To continue this trajectory, guidelines based on evidence and innovations specifically in postoperative care and restrictions are needed.

To align with other advances that have improved recovery, several trials have revisited postoperative activity recommendations after gynecologic surgery to gain more information about when women can safely resume their activities. In this review, we review the current literature around postoperative activity.

WHY DOES POSTOPERATIVE ACTIVITY MATTER?

With increased emphasis on minimally invasive surgical approaches, ERAS, prehabilitation, and

From the Section of Urogynecology and Reconstructive Pelvic Surgery, University of Chicago, Chicago, Illinois.

Each author has confirmed compliance with the journal's requirements for authorship.

Corresponding author: Margaret Mueller, MD, Section of Urogynecology and Reconstructive Pelvic Surgery, University of Chicago Pritzker School of Medicine, Chicago, IL; Margaret.Mueller@bsd.uchicago.edu.

Financial Disclosure

Margaret Mueller disclosed that her institution received funding from the NIH, and she received payment from Butler/Snow. Kimberly Kenton disclosed receiving payment from Butler/Snow.

Copyright © 2024 The Author(s). Published by Wolters Kluwer Health, Inc. This is an open access article distributed under the terms of the Creative Commons Attribution-Non Commercial-No Derivatives License 4.0 (CCBY-NC-ND), where it is permissible to download and share the work provided it is properly cited. The work cannot be changed in any way or used commercially without permission from the journal.

ISSN: 0029-7844/24

same-day surgery, some of the most common questions gynecologic surgeons hear from patients center around resumption of exercise and physical activity and return to work. Given the lack of clear evidence-based recommendations, most surgeons rely on anecdotal instructions passed down from prior surgeons. A recent survey study demonstrated that most gynecologic surgeons placed some restrictions on how much patients could lift after surgery, and 60% recommended that women continue lifting restrictions for at least 6 weeks after a minimally invasive laparoscopic hysterectomy.⁸ Half of participants recommended a 10-lb weight restriction; for perspective, a gallon of milk weighs nearly 10 lb (8.6 lb), as do many women's bags. This contrasts with many public health websites that answer common recovery questions for women after a hysterectomy. For example, the Illinois Department of Public Health notes that patients can go back to normal activity within 1–2 weeks after a vaginal or laparoscopic hysterectomy.⁹ It also obviates many of the benefits of minimally invasive surgery, including earlier return to work and normal activities. Our lack of consensus on postoperative physical activity is a potential source of confusion and deterrent for women contemplating a quality of life-enhancing procedure.

WHAT IS THE POTENTIAL BENEFIT OF POSTOPERATIVE ACTIVITY RESTRICTIONS?

The logical rationale of postoperative activity restrictions is to prevent an adverse event. For laparotomies, one adverse event that surgeons may hope to avoid with postoperative activity restrictions is an abdominal hernia. The proposed mechanism for postoperative hernia development is an increased abdominal pressure resulting in increased forces of the already weakened sutured fascia.¹⁰ Although postoperative activity does increase intra-abdominal pressure, many studies have demonstrated that larger increases in intra-abdominal pressure occur while doing unavoidable, normal physiologic activities such as coughing, defecating, or rising from sitting to standing position compared with controlled physical activity or lifting light weights.^{2,11} “Nonrestrictable” physical activity, including duties or activities of daily living, result in increases in intra-abdominal pressure similar to more strenuous activities. Although surgeons are trying to prevent the adverse event of a postoperative hernia or prolapse recurrence, only a minority of incisional hernias or prolapse recurrences happen during the first year postoperatively.^{5,12} There are likely other important factors involved in the development of a postoperative hernia, vaginal cuff dehiscence, or prolapse

recurrence such as impaired wound healing, infection, hematoma or seroma, or changes in collagen and neuromuscular integrity.¹³ These outcomes are less likely linked to increases in intra-abdominal pressure during the postoperative period and are likely multifactorial in nature.

LACK OF CONSENSUS AMONG SURGEONS

In the field of gynecology, surgeons' recommendations for activity and rest during the postoperative period vary widely. Questionnaire studies of surgeon practices demonstrated this discrepancy with respect to activity, specifically lifting, stair climbing, driving, and having sexual intercourse.⁸ Gynecologic surgeons are not alone in the variability of postoperative instructions; general surgeons also recommend a variety of postoperative activity recommendations. Recently, Schaaf et al¹⁴ queried general surgeons on their prescribed postoperative activity restrictions after hernia repairs (through laparoscopic or open route) nationally. Although there was consensus on the use of some amount of postoperative activity restriction, there was variation in the duration of restriction. Similar results were demonstrated when surgeons were queried regarding restrictions after abdominal surgery. After minimally invasive abdominal surgery, 34% of surgeons restricted activity for 2 weeks, 24% for 4 weeks, and 16% for 6 weeks; only 12% recommended no restrictions after surgery.¹⁵ It is interesting that only 25% of surgeons perceived that their prescribed instructions were evidence based.

The lack of consensus on postoperative instruction further calls into question the utility or necessity of postoperative activity restrictions. Some investigators have even demonstrated that activity does not differ in patients who are instructed to restrict activity and those who are allowed to liberally resume activity.¹⁶ After randomizing women to liberal compared with restricted activity after surgery for POP, Arunachalam and Heit¹⁶ demonstrated that both groups of women achieved similar activity levels according to accelerometer data and self-reported measures of activity.

CONTEMPORARY OUTCOMES DATA ON ACTIVITY RESTRICTIONS

As more surgeons start to question the traditional dogma, several studies have demonstrated that postoperative activity restrictions do not affect surgical outcomes both within and outside of gynecologic surgery. A recent systematic review highlighted a large gap in studies addressing surgical outcomes (of diverse surgical disciplines) related to postoperative

activity restrictions. No studies have evaluated the effect of postoperative activity restrictions on the development of incisional hernias, even though hernia is the adverse event surgeons most want to prevent with restrictions.¹⁵

Two well-designed studies evaluated the effects of postoperative activity restrictions on surgical success in women undergoing prolapse repair.^{17,18} Mueller et al¹⁸ performed a multicenter, double-masked study that randomized women to either liberal or restricted postoperative activity after prolapse repair. Those randomized to liberal activities were instructed to resume activities liberally (including but not limited to running, lifting, strenuous activity, and sit-ups), and those in the restricted activities group were instructed to restrict lifting and physical activities. At 3 months, women randomized to liberal activities were similarly satisfied but reported fewer prolapse and urinary symptoms postoperatively compared with those randomized to restricted activities, and short-term anatomic outcomes were not different.¹⁸ The study also rigorously evaluated the relationship among pelvic floor symptoms, health-related quality of life outcomes, and sexual function. Using PROMIS (Patient-Reported Outcomes Measurement Information System) measures, we found that pelvic floor symptom severity correlated with all domains of health-related quality of life outcomes.¹⁹ O'Shea et al¹⁷ reported similar short-term findings in a randomized noninferiority trial of standard compared with expedited postoperative activity restrictions after prolapse surgery. Three months after surgery, the authors found that expedited activity after POP surgery resulted in noninferior anatomic and symptomatic POP outcomes and concluded that it was reasonable to counsel patients to resume physical activity after POP surgery. Geynisman-Tan also assessed longer-term pelvic floor outcomes such as prolapse recurrence in a planned secondary analysis at 1 year with an 81% retention rate.²⁰ There were no significant differences in functional or anatomic outcomes in women instructed to resume activity liberally compared with those instructed to restrict activity 1 year after surgery.²¹ Further studies of the effect of activity restrictions on longer-term outcomes for prolapse recurrence are needed.

WHAT IS THE POTENTIAL BENEFIT OF ADDING POSTOPERATIVE EXERCISE TO RECOVERY?

Modern data across disciplines (general surgery, orthopedics, and gynecology) suggest that early resumption of activity after surgery is not associated

with adverse patient outcomes. Preoperative exercise regimens even enhance outcomes after abdominal surgery and are considered in some ERAS pathways.^{22,23} The next level of investigation centers on whether recommending some level of activity after surgery may improve patient outcomes. As surgeons and patients became more comfortable with postoperative activity, investigators in both general surgery and orthopedic surgery studied the effects of adding prescriptive postoperative activity. Recently, Heiman et al²⁴ performed a study evaluating the effect of a prescribed exercise regimen on the postoperative recovery of women undergoing breast cancer surgery. Women were randomized to receive instructions regarding a postoperative exercise regimen (30 minutes of aerobic activity a day) or standard postoperative recovery instructions; the primary outcome was subjective postoperative recovery. Although they did not see improved recovery in the women who were assigned to the perioperative exercise regimen, there were no differences in complications between the two groups (15.6% in the intervention group and 18.4% in the control group); however, the study was not powered to detect differences in complications. Although a study limitation was the lack of an objective measurement of recovery, the authors were able to demonstrate that this was a feasible study design with successful implementation in women undergoing surgery.

Onerup et al²⁵ reported similar findings in a randomized controlled study evaluating the effect of preoperative and postoperative prescribed exercise in patients undergoing colorectal cancer surgery. They randomized patients to usual care compared with prescribed exercise regimens 2 weeks before and 4 weeks after surgery. Although they did not see a difference in their primary outcome (self-perceived recovery at 4 weeks), they did not observe any adverse events or increased complications in the intervention group. Although the authors acknowledged that their study was not initially powered with respect to postoperative complications, they noted that they had 6 times the sample size to detect differences in complications according to previous literature.²⁵ Neither study used objective measures of physical activity such as accelerometers to quantify activity in the postoperative period. Although it is unclear from these studies, given their limitations, whether increased physical activity in the postoperative period enhances recovery, regimens designed to promote physical activity likely do not introduce increased risk for complications. Within our own field, most research on postoperative exercise has been on post-cesarean delivery

activity. Numerous studies report the importance of early, moderate physical exercise after cesarean delivery as measured by pedometers.^{26–28} Further studies promoting enhanced physical activity in the postoperative period with objective quantitative measures would be helpful in elucidating the role that physical activity might have on postoperative recovery.

IS THERE HARM IN RESTRICTING ACTIVITY?

As we examine the risk–benefit profile of postoperative activity, it is possible that activity restriction during the postoperative period may inadvertently expose patients to additional risk. Surgery typically has a negative effect on physical movement and exercise capacity for a period of time. The current Centers for Disease Control and Prevention guidelines for aerobic activity in adults recommend that adults carry out at least 150 minutes/week of moderate-intensity physical activity to decrease the incidence of chronic diseases.²⁹ Unfortunately, for many patients, the discomfort of their disease leading to surgery prevents them from completing this degree of physical activity. As a result, many women come to surgery with a decreased baseline exercise tolerance and some degree of muscle deconditioning. Studies demonstrate that after just 2 weeks of reduced physical activity, noticeable deconditioning occurs, with decreases in muscle mass, maximal oxygen uptake or maximal aerobic capacity (VO_2max), and cardiac output.³⁰ Therefore, for many women, especially those with comorbid conditions who could benefit from exercise, a 6-week imposed postoperative restriction along with their preoperative limitations can be significant.

One adverse event associated with restricting postoperative activity is venous thromboembolism (VTE). Immobilization can lead to venous stasis, an important risk in the development of postoperative VTE. Over the past 20 years, the incidence of VTE in patients undergoing orthopedic surgery has decreased.³¹ Although reduction in VTE is multifactorial, most surgeons hypothesize earlier postoperative mobilization is a likely contributor.³² Although the incidence of VTE is much lower in the postoperative period after gynecologic surgery and even lower after prolapse procedures, it contributes to important morbidity and should not be overlooked.^{33,34}

CONCLUSION

Although innovations in surgical modalities and ERAS have drastically improved recovery in women undergoing gynecologic and urogynecologic surgery,

the effect of physical activity restrictions on recovery has been overlooked. Currently, there is little evidence to support benefit of physical activity restrictions after gynecologic surgery. As surgeons, supporting optimal approaches to recovery while minimizing harm is an important goal and warrants additional research.

REFERENCES

1. Carter-Brooks CM, Du AL, Ruppert KM, Romanova AL, Zyczynski HM. Implementation of a urogynecology-specific enhanced recovery after surgery (ERAS) pathway. *Am J Obstet Gynecol* 2018;219:495.e1–10. doi: 10.1016/j.ajog.2018.06.009
2. Weir LF, Nygaard IE, Wilken J, Brandt D, Janz KF. Postoperative activity restrictions: any evidence? *Obstet Gynecol* 2006; 107:305–9. doi: 10.1097/01.AOG.0000197069.57873.d6
3. Buckwalter JA. Activity versus rest in the treatment of bone, soft tissue and joint injuries. *Iowa Orthop J* 1995;15:29–42.
4. Nager CW, Visco AG, Richter HE, Rardin CR, Rogers RG, Harvie HS, et al. Effect of vaginal mesh hysterectomy vs vaginal hysterectomy with uterosacral ligament suspension on treatment failure in women with uterovaginal prolapse: a randomized clinical trial. *JAMA* 2019;322:1054–65. doi: 10.1001/jama.2019.12812
5. Barber MD, Brubaker L, Burgio KL, Richter HE, Nygaard I, Weidner AC, et al. Comparison of 2 transvaginal surgical approaches and perioperative behavioral therapy for apical vaginal prolapse: the OPTIMAL randomized trial. *JAMA* 2014; 311:1023–34. doi: 10.1001/jama.2014.1719
6. Anger JT, Mueller ER, Tarnay C, Smith B, Stroupe K, Rosenman A, et al. Robotic compared with laparoscopic sacrocolpopexy: a randomized controlled trial. *Obstet Gynecol* 2014;123: 5–12. doi: 10.1097/AOG.0000000000000006
7. Romanova AL, Carter-Brooks C, Ruppert KM, Zyczynski HM. 30-Day unanticipated healthcare encounters after prolapse surgery: impact of same day discharge. *Am J Obstet Gynecol* 2020;222:482.e1–8. doi: 10.1016/j.ajog.2019.11.1249
8. Winkelmann WD, Erlinger AL, Haviland MJ, Hacker MR, Rosenblatt PL. Survey of postoperative activity guidelines after minimally invasive gynecologic and pelvic reconstructive surgery. *Female Pelvic Med Reconstr Surg* 2020;26:731–6. doi: 10.1097/SPV.0000000000000697
9. Illinois Department of Public Health. Facts about hysterectomy. Accessed December 1, 2023. www.idph.state.il.us/about/womenshealth/factsheets/hyster.htm
10. Urschel JD, Scott PG, Williams HT. Etiology of late developing incisional hernias: the possible role of mechanical stress. *Med Hypotheses* 1988;25:31–4. doi: 10.1016/0306-9877(88)90043-6
11. Iqbal A, Haider M, Stadlhuber RJ, Karu A, Corkill S, Filipi CJ. A study of intragastric and intravesicular pressure changes during rest, coughing, weight lifting, retching, and vomiting. *Surg Endosc* 2008;22:2571–5. doi: 10.1007/s00464-008-0080-0
12. Itatsu K, Yokoyama Y, Sugawara G, Kubota H, Tojima Y, Kurumiya Y, et al. Incidence of and risk factors for incisional hernia after abdominal surgery. *Br J Surg* 2014;101:1439–47. doi: 10.1002/bjs.9600
13. Pollock AV, Evans M. Early prediction of late incisional hernias. *Br J Surg* 1989;76:953–4. doi: 10.1002/bjs.1800760926
14. Schaaf S, Schwab R, Gsgen C, Vilz TO, Willms A. Recommendations on postoperative activities after abdominal operations and incisional hernia repair—a national and international

survey. *Front Surg* 2021;8:713138. doi: 10.3389/fsurg.2021.713138

15. Loor MM, Dhanani NH, Trautner BW, Hughes TG, Schwartz J, Wei Q, et al. Current surgeon practices for postoperative activity restrictions after abdominal surgery vary widely: a survey from the communities on the ACS website. *Surgery* 2020;168:778–84. doi: 10.1016/j.surg.2020.05.035
16. Arunachalam D, Heit MH. Impact of postoperative instructions on physical activity following pelvic reconstructive surgery: a randomized controlled trial. *Int Urogynecol J* 2020;31:1337–45. doi: 10.1007/s00192-020-04239-y
17. O’Shea M, Siddiqui NY, Truong T, Erkanli A, Barber MD. Standard restrictions vs expedited activity after pelvic organ prolapse surgery: a randomized clinical trial. *JAMA Surg* 2023;158:797–805. doi: 10.1001/jamasurg.2023.1649
18. Mueller MG, Lewicky-Gaupp C, Collins SA, Abernethy MG, Alverdy A, Kenton K. Activity restriction recommendations and outcomes after reconstructive pelvic surgery: a randomized controlled trial. *Obstet Gynecol* 2017;129:608–14. doi: 10.1097/AOG.0000000000001924
19. Cella D, Riley W, Stone A, Rothrock N, Reeve B, Yount S, et al. The Patient-Reported Outcomes Measurement Information System (PROMIS) developed and tested its first wave of adult self-reported health outcome item banks: 2005–2008. *J Clin Epidemiol* 2010;63:1179–94. doi: 10.1016/j.jclinepi.2010.04.011
20. Geynisman-Tan J, Kenton K, Komar A, Collins S, Lewicky-Gaupp C, Mueller MG. Recovering sexual satisfaction after prolapse surgery: a secondary analysis of surgical recovery. *Int Urogynecol J* 2018;29:1675–80. doi: 10.1007/s00192-018-3690-7
21. Mueller MG, Collins SA, Lewicky-Gaupp C, Tavathia M, Kenton K. Restricted convalescence following urogynecologic procedures: 1-year outcomes from a randomized controlled study. *Female Pelvic Med Reconstr Surg* 2021;27:e336–41. doi: 10.1097/SPV.0000000000000922
22. Kamarajah SK, Bundred J, Weblin J, Tan BHL. Critical appraisal on the impact of preoperative rehabilitation and outcomes after major abdominal and cardiothoracic surgery: a systematic review and meta-analysis. *Surgery* 2020;167:540–9. doi: 10.1016/j.surg.2019.07.032
23. Barberan-Garcia A, Ubré M, Roca J, Lacy AM, Burgos F, Risco R, et al. Personalised prehabilitation in high-risk patients undergoing elective major abdominal surgery: a randomized blinded controlled trial. *Ann Surg* 2018;267:50–6. doi: 10.1097/SLA.0000000000002293
24. Heiman J, Onerup A, Wessman C, Haglind E, Olofsson Bagge R. Recovery after breast cancer surgery following recommended pre and postoperative physical activity: (PhysSURG-B) randomized clinical trial. *Br J Surg* 2021;108:32–9. doi: 10.1093/bjs/znaa007
25. Onerup A, Andersson JP, Angenete EP, Bock D, Börjesson M, Ehrencrona C, et al. Effect of short-term homebased pre- and postoperative exercise on recovery after colorectal cancer surgery (PHYSSURG-C): a randomized clinical trial. *Ann Surg* 2021;275:448–55. doi: 10.1097/sla.0000000000004901
26. Ganer Herman H, Ben Zvi M, Kleiner I, Tairy D, Kuper Sason L, Bar J, et al. Mobility following cesarean delivery: an observational study utilizing pedometers. *J Matern Fetal Neonatal Med* 2020;33:774–9. doi: 10.1080/14767058.2018.1500549
27. Ganer Herman H, Kleiner I, Tairy D, Gonen N, Ben Zvi M, Kovo M, et al. Effect of digital step counter feedback on mobility after cesarean delivery: a randomized controlled trial. *Obstet Gynecol* 2020;135:1345–52. doi: 10.1097/AOG.0000000000003879
28. Engel O, Haikin Herzberger E, Yagur Y, Hershko Klement A, Fishman A, Constantini N, et al. Walking to a better future? Postoperative ambulation after cesarean delivery and complications: a prospective study. *Int J Gynaecol Obstet* 2022;157:391–6. doi: 10.1002/ijgo.13815
29. U.S. Department of Health and Human Services. Physical activity guidelines for Americans. 2nd ed. U.S. Department of Health and Human Services; 2018. p. 56.
30. Neuffer PD. The effect of detraining and reduced training on the physiological adaptations to aerobic exercise training. *Sports Med* 1989;8:302–20. doi: 10.2165/00007256-198908050-00004
31. Partridge T, Jameson S, Baker P, Deehan D, Mason J, Reed MR. Ten-year trends in medical complications following 540,623 primary total hip replacements from a national database. *J Bone Joint Surg Am* 2018;100:360–7.
32. Xu K, Chan N, Ibrahim Q, Kruger P, Sinha S, Bhagirath V, et al. Reduction in mortality following elective major hip and knee surgery: a systematic review and meta-analysis. *Thromb Haemost* 2019;119:668–74. doi: 10.1055/s-0039-1677732
33. Jorgensen EM, Li A, Modest AM, Leung K, Moore Simas TA, Hur HC. Incidence of venous thromboembolism after different modes of gynecologic surgery. *Obstet Gynecol* 2018;132:1275–84. doi: 10.1097/AOG.0000000000002918
34. Mueller MG, Pilecki MA, Catanzarite T, Jain U, Kim JY, Kenton K. Venous thromboembolism in reconstructive pelvic surgery. *Am J Obstet Gynecol* 2014;211:552.e1–6. doi: 10.1016/j.ajog.2014.07.031

PEER REVIEW HISTORY

Received October 4, 2023. Received in revised form November 14, 2023. Accepted December 1, 2023. Peer reviews and author correspondence are available at <http://links.lww.com/AOG/D555>.