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Activity Restrictions after Gynecologic Surgery: Is There Evidence?

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Abstract

Introduction—Many surgeons recommend rest and restricting activities to their patients after surgery. The aim of this review is to summarize the literature regarding types of activities gynecologic surgeons restrict and intra-abdominal pressure during specific activities and to provide an overview of negative effects of sedentary behavior (rest).

Methods—We searched Pubmed and Scopus for years 1970 until present and excluded studies that described recovery of activities of daily living after surgery as well as those that assessed intra-abdominal pressure for other reasons such as abdominal compartment syndrome and hypertension. For our review of intra-abdominal pressure, we excluded studies that did not include a generally healthy population, or did not report maximal intra-abdominal pressures.

Results—We identified no randomized trial or prospective cohort study that studied the association between post-operative activity and surgical success after pelvic floor repair. The ranges of intra-abdominal pressures during specific activities are large and such pressures during activities commonly restricted and not restricted after surgery overlap considerably. There is little concordance in mean peak intra-abdominal pressures across studies. Intra-abdominal pressure depends on many factors, but not least the manner in which it is measured and reported.

Conclusions—Given trends towards shorter hospital stays and off work intervals, which both predispose women to higher levels of physical activity, we urge research efforts towards understanding the role of physical activity on recurrence of pelvic organ prolapse and urinary incontinence after surgery.

Keywords

gynecologic surgery; physical activity; recovery; restrictions

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Introduction

Many surgeons recommend rest and restricting activities to their patients after surgery. While rest may be helpful for controlling pain and post-operative fatigue, the main reason surgeons in fields from orthopedics to gynecology restrict activity is to promote postoperative healing and decrease surgical failure. The role of activity versus rest has long been debated in the healing of bone, soft tissue and joint injuries. Historically, most clinicians believed that rest was vital and that using injured musculoskeletal tissues too soon increased inflammation and disrupted repair tissue, thus preventing healing. However, there is now a body of evidence in orthopedics to support a counter-opinion: that controlled early resumption of activity promotes restoration of function, while treating injuries with prolonged rest delays recovery.[1]

General surgeons and gynecologists also struggle with this issue. Trends towards increasing outpatient surgeries and shorter hospital stays inevitably lead to less extended bedrest and so questions now about post-operative activity pertain less to rest and more to which specific activities should be avoided. For conditions with relatively high failure rates after surgery, like abdominal wall hernias and pelvic organ prolapse, surgeons suggest anything possible that they think might impact healing, including many daily activities. However, as in orthopedics, it may be that some pelvic loading that occurs from increasing abdominal pressure may promote tissue remodeling and muscle maintenance and thus excessive rest may actually be a risk for recurrent prolapse.

In this review, our aims are to summarize the literature regarding types of activities gynecologic surgeons restrict and intra-abdominal pressure during specific activities and to provide an overview of negative effects of sedentary behavior (rest).

Methods

We searched the English literature in Pubmed and Scopus for years 1970 until present. To access literature about activity restrictions after pelvic and abdominal gynecologic surgery, we used the terms: hysterectomy, pelvic organ prolapse, urinary incontinence, post-operative, physical activity, exercise. We excluded articles that described recovery of activities of daily living after surgery. To summarize intra-abdominal pressures during physical activities, we used the terms: intra-abdominal pressure, maximal, activity, exercise, lifting, and postoperative. We excluded studies that assessed intra-abdominal pressure for other reasons such as abdominal compartment syndrome and hypertension. Additionally we excluded studies that did not include a generally healthy population, or did not report maximal intra-abdominal pressures. All pressures in the table are reported in CmH2O, thus many pressures were converted from their original measure (i.e. kPa, mmHg).

Results

We identified no randomized trial or prospective cohort study exists that studied the association between post-operative activity and surgical success.

The state of activity restrictions

In a 2001 survey of 287 gynecologic surgeons, all recommended some types of activity restrictions after common pelvic surgeries (abdominal hysterectomy, vaginal hysterectomy with or without vaginal repairs and Burch urethropexy).[2] Ninety nine percent restricted intercourse after hysterectomy for a mean of 5.8 weeks (range 2–12 weeks), as did 87% after Burch urethropexy. About 90% restricted driving for a mean of 2–3 weeks. Depending on the surgery, 88–99% of surgeons restricted lifting for mean of 5–7 weeks (range 1–26 weeks and up to “forever” after vaginal hysterectomy with vaginal repairs). About one-fifth restricted stair climbing.

A panel of 12 experts, in 2011, used a modified Delphi method and literature review to develop multidisciplinary recommendations for graded resumption of activity after laparoscopic, vaginal and abdominal hysterectomies.[3] The panel considered 65 activities; after judging 38 relevant for convalescence recommendations, it achieved consensus after four Delphi rounds and two group discussions. The recommendations were then judged as feasible by a representative sample of 63 physicians. Examples of recommendations after vaginal hysterectomy include avoiding lifting or carrying over 10 kg, bicycle riding and vacuum cleaning for 3 weeks, and avoiding lifting or carrying over 15 kg and “standing and walking during the entire working day” for 4 weeks. Restrictions for the same sets of activities were lifted after 3–4 weeks and 6 weeks, respectively, after abdominal hysterectomy, and after 2 and 3 weeks, respectively, after laparoscopic supracervical hysterectomy. Of interest these Dutch authors point out that the American Disability Advisor guideline (which we U.S. authors admit to no knowledge of) recommends optimum lengths of disability after laparoscopic, vaginal and abdominal hysterectomy of 4, 4, and 6 weeks, respectively, for sedentary work and 10, 10 and 12 weeks, respectively, for very physically demanding jobs.

In a study of French urologists and gynecologists, low-experienced surgeons restricted lifting for median 6 weeks (range 4–10) after laparoscopic sacral colpopexy, compared to 4 weeks (range 2–8) for high-experienced surgeons.[4] Danish general practitioners and gynecologists restricted sexual intercourse for a median of four weeks after hysterectomy (0–12 weeks) and ranged from restricting lifting a maximum of 15 kg for two weeks to not lifting over 2 kg for 12 weeks.[5] Amongst the gynecologists, the recommended convalescence was median 4–5 weeks for strenuous activities, and median 1–2 weeks for non-strenuous activities, with ranges from 0–24 weeks.[6] These great variances were not explained by demographic differences between gynecologists.

Dutch researchers have designed a randomized controlled trial to assess the effect of a multidisciplinary care program, compared to usual care, on full sustainable return to work in 212 women ages 18–65 years after gynecological surgery (Netherlands Trial Register (NTR): NTR2087). These results will be a welcome addition to the literature.[7]

The paucity of evidence about activity restriction after gynecologic surgery is shared in the hernia literature (a condition that is at least somewhat analogous to pelvic organ prolapse). In a recent review of inguinal hernias, the authors note: “Some theories hold that Valsalva maneuver, coughing, straining, heavy lifting and possibly physical activity may be the cause of groin herniation, and continuing these activities will increase the risk of enlargement or strangulation”, but, “Whether and how to restrict activity in the case of an inguinal hernia is unsupported in the literature.”[8]

As an aside, it is also of interest to note that while the etiology of low back pain is unclear (just as is the etiology of pelvic organ prolapse), physical activities in the workplace may be incorrectly implicated in the development of low back pain. In a recent systematic review of studies reporting an association between occupational carrying and low back pain, the authors identified (from 2,766 citations) nine high-quality studies including four case-control studies and five prospective cohort studies that together provided “strong and consistent evidence against a statistical association between carrying and low back pain”. They concluded that it is unlikely that occupational carrying is independently causative of low back pain in the populations of workers studied.[9]

Theoretical rationale for activity restrictions

Collagen begins to appear in the wound on the second day, and maximum synthesis occurs around the fifth day.[10] Abdominal fascia regains 51 to 80% of original tensile strength at 6 weeks, 70–80% at 17 weeks and 73–93% by 20 weeks, but tensile strength never achieves the level of the same pre-wounded tissue.[9,11]

The breaking strength, or the load required to break a wound, is difficult to assess in women in vivo. Studies of wound breaking strength or suture tensile strength are performed on animals or in the laboratory setting. We found no articles assessing these parameters in live, intact women (nor do we think such a study is ethically possible!). Thus, surgeons and patients are faced with a dilemma: They can know that wounds aren't strong for some period of time after surgery, but they can't know what kinds of loads are needed to break a wound in a given person. To be on the safe side, then, many surgeons recommend significant restrictions for varying lengths of time.

How much activity should people do?

The Centers for Disease Control recently published guidelines for the minimum amount and type of physical activity people need to fulfill in order to improve health, with a special focus on prevention of heart disease and diabetes and on improving muscular fitness. According to these guidelines, adults ages 18 to 64 years should do one of three weekly activity packages: (1) 150 min of moderate intensity aerobic activity per week plus muscle strengthening activities that “work all major muscle groups” on 2 or more days of the week, or (2) 75 min of vigorous intensity aerobic activity per week plus muscle strengthening activities on 2 or more days of the week, or (3) 150 min of an equivalent mix of moderate and vigorous intensity aerobic activity per week plus muscle strengthening activity on 2 or more days of the week.[12] Aerobic activities are classified by their level of cardiac exertion. Examples of moderate intensity activities include walking fast, pushing a lawnmower and riding a bicycle on level ground. Examples of vigorous intensity activities include jogging, playing basketball and riding a bicycle up hills or fast. Muscle strengthening activities include activities such as lifting weights, working with resistance bands, heavy gardening and yoga.

The downside of activity restriction

However, activity restriction has potential to cause harm. The extreme example of prolonged bed rest, typically limited to those with critical illness, demonstrates that lack of weight bearing and/or muscular activity has profound impact on health. Loss of muscle mass and strength, increased calcium excretion, and a host of cardiovascular and metabolic outcomes associated with bed rest lead some to question whether the benefits can ever outweigh the risks.[13] Even more common and less severe activity restriction than bed rest, such as long distance air travel, increases risk for thromboembolism.[14]

Changing leisure time pursuits and increased occupational sitting has led to the study of sedentary behavior as a construct *independent* of physical activity: that is, those who meet recommended levels of physical activity may also have exposure to considerable inactivity.[15] Evidence is emerging that excessive sedentary behavior is detrimental in its own right and the negative impact of sitting for long hours may not be counterbalanced by regular exercise. In a prospective study of men and women over 50 years, 7 days of movement was objectively assessed by accelerometry. Those in the 3rd and 4th highest quartiles of sedentary behavior (primarily sitting) had significantly higher mortality risk when compared to those in the lowest quartiles, independent of the level of moderate to vigorous physical activity.[16] Prolonged sitting without interruption is related to many risk factors for cardiovascular disease, leading some to call for intervention trials to determine whether uninterrupted sitting time is causal for cardiovascular disease.[17] Compared to various types of activity, predominantly sedentary behavior decreases wound healing in people with leg ulcers, prolongs healing time for metatarsal fractures, causes neck and back pain, predisposes to venous thromboembolism and impairs recovery after cardiovascular events.[18,19,20,21]

And, of course, whether women are even able to comply with restrictions depends on many factors outside of the surgeon's control, such as number of dependents at home, lifestyle, support system, and financial ability to not work.

How much do activities raise intra-abdominal pressure?

Surgeons develop their post-operative guidelines based on an intuition about which activities raise the intra-abdominal pressure 'too much'. Anecdotal evidence plays a big role in these recommendations: when a patient presents four weeks after surgery for pelvic organ prolapse with recurrent vaginal vault prolapse and tells the surgeon that she felt the bulge suddenly descend when she picked up a gallon milk jug, the surgeon might begin advising all patients post-operatively to lift nothing heavier than a quart of liquid.

In Tables 1 and 2, we summarize literature that we identified related to how much the intra-abdominal pressure (IAP) actually rises during various activities. Table 1 summarizes various exercises. In Table 2, we demonstrate side-by-side IAPs that occur during activities often restricted after surgery (like heavy lifting) and those generally not restricted (like climbing stairs). Several things are apparent: 1) The range of IAP during specific activities is large. Measured the same way, doing the same standardized activity, the IAP in one woman may be very low and in another very high. 2) There is little concordance in mean peak IAPs across studies. IAP depends on many factors, but not least the manner in which it is measured and reported. 3) IAPs during restricted and unrestricted activities overlap considerably.

To provide a more rigorous foundation from which to study the effect of IAP on vaginal support, tissue mechanics, post-operative recovery and other important constructs, our group has developed a wireless vaginal pressure sensor[22,23] and we are currently testing different methods for calculating IAP using software, test-retest reproducibility of IAP during various prescribed activities, variation in IAP during specific activities performed differently, and IAP ranges during a host of activities performed in the 'real world'.

Conclusion

Moderate and vigorous physical activities have numerous health benefits, whilst excessive sedentary behavior, even in people that engage in regular exercise, is detrimental. Many physicians restrict activities after pelvic floor surgeries, sometimes for indefinite periods of time. The balance of activity to optimally support and maintain pelvic floor function in healthy populations and after surgical interventions for pelvic floor disorders has yet to be elucidated.

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Table 1

IAP reported for Exercise Activities (cmH_2O)

	Participants	Method	Walking		Jumping		Abdominal crunches		Bench press	
			Maximal Range	Mean Maximal	Maximal Range	Mean Maximal	Maximal Range	Mean Maximal	Maximal Range	Mean Maximal
Cobb (2005)[24]	10 men/10 women	Intravesical			58.5–342.7	232.6±65.8	9.5–63.9	36.3±14.6	2.7–46.2 (25 lbs)	10.1±9.9
Grillner (1978)[25]	12 men/1 woman	Naso-gastric		20.4*(3.7 mph)		74.8*				
Guttormson (2008)[26]	2 men/7 women	Intravesical					15.8–73.4 (sit-up)	45.7‡		
Harman (1988)[27]	11 physically active men	Naso-gastric				177.4±59.1§				109.1 ±60.3§
Iqbal (2008)[28]	10 volunteers	Naso-gastric								17.7 (26 lbs)
		Intravesical								164.5 (26 lbs)
Weir (2006)[29]	30 women	Rectal	48–190 (3.3 mph)	79†	59–189.7 (jumping jacks)	126.7†	19.7–174	68†		

*estimated from graph therefore no SD is provided

†median

‡no SD provided

§maximal lift

Table 2

		IAP Reported for Everyday Activities (cmH_2O)											
		Commonly Restricted Activities						Unavoidable unrestricted activities					
Reference	Method	Lift from ground heavy		Lift from counter heavy		Stairs		Sitting to Standing		Lift from ground light		Lift from counter light	
		Maximal Range	Mean Maximal	Maximal Range	Mean Maximal	Maximal Range	Mean Maximal	Maximal Range	Mean Maximal	Maximal Range	Mean Maximal	Maximal Range	Mean Maximal
Cobb (2005) [11]	Intravesical					54.4–149.6	93.7 ± 23.7						
Essendrop (2004) [30]	Naso-gastric			84.3 ±22.3 (33 lbs)									
Gerten (2008)[31]	Rectal		82* (33 lbs)		54* (33 lbs)						48* (5.5 lbs)		10* (5.5 lbs)
Guttormson (2008) [13]	Intravesical	29.6–146.3 (40 lbs)	94.9‡	32.6–116.4 (40 lbs)	86.1‡			26.9–80	47.6‡	23.2–76.2 (10 lbs)	54.1‡	21.5–60.9 (10lbs)	38.9‡
Hagins (2004)[32]	Naso-gastric		68.3 ± 31 (70% maximal lift)								54.3± 11 (35% maximal lift)		
Harman (1988) [14]	Naso-gastric		217.8±71.6§										
Kawabata (2010)[33]	Rectal		170 (H)* 142.8 (U)*§								35.4 (H)* 21.8 (U)* (30 %maximal lift)		
Mouritsen (2007)[34]	Vaginal										22.3 ± 10.8 (11 lbs, pre-surgery)		
Weir (2006)[16]	Rectal	65.5–335 (35 lbs)	149.3†	57–264 (35lbs)	92.5†	34–116.3	70†	36–229	70†	37–163.3 (8lbs)	74.7†	20.7–84 (8 lbs)	47.7†

*estimated from graph therefore no SD is provided

†median

‡no SD provided

§maximal lift

(H)- highly trained participants

(U)- untrained participants