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Postoperative Activity Restrictions After Reconstructive Pelvic Surgery

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Abstract

Importance Restrictive physical activity after pelvic reconstructive surgery is recommended, although the optimal duration and intensity are not standardized.

Objective This systematic review and meta-analysis aimed to evaluate the existing literature comparing clinical outcomes for liberal postoperative physical activity versus standard of care, defined as restricted postoperative physical activity, after pelvic reconstructive surgery.

Study Design PubMed, CENTRAL, Scopus, Web of Science, and CINAHL databases were searched for observational and randomized studies comparing liberal postoperative physical activity and standard of care in women undergoing pelvic reconstructive surgery, reporting anatomic and functional outcomes. Statistical analysis was performed using RevMan software, presenting results as mean difference (MD) or odds ratio in a random-effects model, with 95% confidence intervals (CIs).

Results Five randomized trials, representing total n = 434, were included, with 2 studies on sling surgical procedures and 3 on prolapse surgical procedures. Data from 3 studies

suggest no significant difference between liberal and standard postoperative instructions in surgical outcomes, measured by Point Ba from POP-Q assessment tool, up to 3 months follow-up (MD, -0.04 ; 95% CI, -0.16 to 0.07 ; $P = 0.49$). Disease-specific symptom distress, measured by Pelvic Floor Distress Inventory-20, favored the liberal approach (MD, -10.09 ; 95% CI, -18.33 to -1.86 ; $P = 0.02$). Other domains, including Urinary Distress Inventory-6, also showed significant improvements with liberal postoperative activities (MD, -4.29 ; 95% CI, -7.84 to -0.74 ; $P = 0.02$).

Conclusions Patients with liberal postoperative physical activity recommendations in prolapse repair surgical procedures had similar short-term anatomic outcomes compared with standard restrictions, with more favorable outcomes in disease-specific symptom relief and quality of life.

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WHY THIS MATTERS

Surgical specialties have seen a shift from the traditional restrictive approaches to more liberal postoperative physical activity recommendations. However, limited research has been conducted in the field of pelvic reconstructive surgery, particularly after discharge. Our analysis showed no significant difference in prolapse repair anatomical outcomes between liberal and restricted postoperative care recommendations. However, significant differences were observed in qualitative measures assessing disease associated distress and quality of life, favoring the liberal group. Analysis on sling procedures was not obtained due to the limited number of studies identified, highlighting the need for additional research examining postoperative restrictions. Acknowledging the limited data, our findings suggest that a more liberal approach to postoperative physical activity may not compromise short-term surgical outcomes compared with traditional restrictive recommendations, potentially offering reassurance for patient counseling.

Postoperative care following reconstructive pelvic surgery, which includes prolapse repair and stress urinary incontinence (SUI) procedures, traditionally involves strict physical activity restrictions to ensure proper healing and to minimize the risk of recurrence or complications.¹ In a 2001 survey of 287 gynecologists, all surgeons recommended activity restrictions after common gynecologic surgical procedures. Nearly all the respondents recommended avoiding intercourse after hysterectomy for 6 weeks, driving restrictions for 2–3 weeks, and weightlifting restrictions for 5–7 weeks.^{2,3} recommendations are based on the belief that limited physical activity may facilitate better anatomical and functional recovery, though this practice lacks substantial empirical validation and standardization.⁴ For instance, the basis for enforcing weightlifting restriction is to avoid an increase in intraabdominal pressure. However, Weir et al⁵ measured intra-abdominal pressure across a variety of exercises with the use of rectal catheters and found that activities such as lifting weights did not increase intra-abdominal pressure more than daily activities such as going from sitting to standing. Other studies have reinforced this opinion.^{6–8}

Additionally, surgical procedures can induce a stress response that may contribute to muscle wasting.⁹ Therefore, imposing postoperative physical activity restrictions could further exacerbate the muscle mass loss, especially in those patients with comorbidities or with a preexisting level of muscle deconditioning.^{10,11}

As a result, there is growing interest in the potential benefits of more liberal physical activity allowances after surgery. Emerging evidence from various surgical fields suggests that early mobilization and liberal activity may not compromise surgical outcomes and might enhance patients' recovery and quality of life.^{12–14} Specific to urogynecologic procedures, Mueller et al¹⁵ showed no differences in satisfaction and surgical outcomes between liberal and restricted postoperative physical activity recommendations 1 year after prolapse surgery.¹⁵ Another study by O'Shea et al¹⁶ demonstrated similar short-term outcomes and found that expedited activity was noninferior to standard of care.

This systematic review and meta-analysis aimed to evaluate the existing literature comparing liberal postoperative physical activity recommendations versus the traditional standard of care in terms of anatomical and functional outcomes following pelvic reconstructive surgery. By synthesizing data from multiple studies, we aimed to provide evidence to inform clinical practice.

OBJECTIVE

We conducted a preliminary search of PROSPERO, PubMed, and the Cochrane Database of Systematic Reviews and found no current or underway systematic reviews on this topic. This systematic review and meta-analysis specifically focuses on evaluating anatomic and symptomatic outcomes, including objective surgical success, disease-specific symptom distress and quality of life impact, functional postoperative activity, and adverse events within 3 months after surgery. Our objective was to conduct a comprehensive analysis of randomized controlled trials (RCTs) and observational studies to compare liberal postoperative physical activity recommendations with standard restrictions in terms of objective surgical success, patient-reported outcomes, and adverse events.

METHODS

Eligibility Criteria

Studies were included if they met the following criteria:

(1) RCTs and nonrandomized cohorts that compared liberal postoperative physical activity recommendations to standard of care for reconstructive pelvic surgery, including prolapse repair and urinary incontinence procedures; (2) in female patients ≥ 18 years old; and (3) reporting any of the outcomes of interest.

Liberal postoperative physical activity recommendations were defined as a reduction of physical activity restrictions by intensity and duration, including resumption of lifting and strenuous exercise as tolerated by patient.

We excluded case reports, letters, editorials, reviews, and animal studies. Studies containing overlapping populations were identified by reviewing authors' names, affiliated institutions, and patient recruitment time frame, then excluded to remove any possible duplicate data in the meta-analysis.

Search Strategy and Data Extraction

A systematic search was conducted across 5 electronic databases: (1) PubMed, (2) Scopus, (3) Cochrane Central Register of Controlled Trials (CENTRAL), (4) Web of Science, and (5) Cumulative Index to Nursing and Allied Health Literature (CINAHL). We searched for studies published up to July 21, 2024, that met our predetermined inclusion criteria without imposing restrictions. To develop a comprehensive search strategy adaptable to each database, A.C.B. and L.S.-L.M. identified relevant keywords, synonyms, and MeSH terms addressing urogynecologic reconstructive pelvic surgery, postoperative care interventions for female patients, and treatment outcomes. An initial comprehensive search of all selected databases was conducted on November 21, 2023,

with no language restrictions. An updated follow-up search was conducted on July 12, 2024, to capture any newly published relevant studies since the initial search. See Supplemental Digital Content available at <http://links.lww.com/FPMRS/A567>, for the detailed search strategy. Reference lists of included studies were systematically searched for articles that were deemed to meet inclusion criteria.

Study screening and data extraction were performed independently by 3 reviewers (A.C.B., P.H.C.M.d.S., and G.F.) based on the predefined inclusion and exclusion criteria. The selection of articles was performed in 4 separate steps: (1) removal of duplicates, (2) study title and abstract screening, (3) full text review of articles that met inclusion criteria, and (4) data extraction from the included full-text articles. Covidence systematic review software (Veritas Health Innovation, Australia) and Microsoft Excel (2021, Microsoft Corporation) were used for this process.^{17,18} Disagreements between authors were resolved by consensus. The protocol study was submitted to PROSPERO on November 29, 2023, and was subsequently registered as CRD42023488187. This study was exempt from institutional review board approval.

Outcomes

Our primary outcome of interest was surgical success. For prolapse surgical procedures, objective surgical success was measured by Point Ba from the POP-Q assessment tool, as this was universally reported by all studies and the most common compartment of prolapse recurrence.^{19,20} For sling surgical procedures, objective success was defined as a negative cough stress test result. Secondary endpoints included validated questionnaires used in the studies, including the following: (1) disease-specific symptom distress and quality of life impact questionnaires, including Pelvic Floor Distress Inventory-20 (PFDI-20) and Pelvic Floor Impact Questionnaire-7 (PFIQ-7), (2) functional activity during postoperative period measured by the Activity

Assessment Scale (AAS) tool, and (3) number of adverse events, assessed immediately or up to 3 months after surgery. The PFDI-20 includes the Pelvic Organ Prolapse Distress Inventory-6 (POPDI-6), Urinary Distress Inventory-6 (UDI-6), and Colorectal-Anal Distress Inventory (CRADI-8) subscales. The PFIQ-7 consists of the Pelvic Organ Prolapse Impact Questionnaire-7= (POPIQ-7), Urinary Impact Questionnaire-7 (UIQ-7), and Colorectal-Anal Impact Questionnaire-7 (CRAIQ-7) subscales. Both validated questionnaires measure distress caused by lower urinary tract, lower gastrointestinal tract, and pelvic organ prolapse symptoms in women with pelvic floor dysfunction.²¹ The Activity Assessment Scale is a validated tool for assessing changes in functional outcomes and monitoring postoperative recovery.²² Adverse events were identified based on direct mention of postoperative complications in the studies, such as urinary tract infections or mesh exposure, or complications classified in the Clavien-Dindo

scale.²³ If multiple time points were provided for every outcome, the time point furthest away from the index surgery, within the 6 weeks to 3 months follow-up time frame, was extracted for each study.

Quality Assessment

For quality assessment, the Risk of Bias 2 (ROB2) Cochrane tool was used to individually assess the risk of bias in each study.²⁴ This tool scores RCTs' risk as "low," "some concerns," and "high" in 5 domains. This part of the systematic review and meta-analysis was performed independently by 2 different authors (A.C.B. and G.F.). Disagreements were resolved by consensus between the 2 authors. A funnel plot to detect publication bias was not applied due to the small number of studies included in this review.²⁵ The GRADE (Grading for Recommendations Assessment, Development and Evaluation) assessment, which spans from very low to high level of certainty, was used to evaluate the quality of evidence associated for each endpoint.²⁶

Statistical Analysis

This systematic review and meta-analysis was performed according to the Cochrane Handbook's recommendations and the Preferred Reporting Items for Systematic Reviews and Meta-Analysis (PRISMA) guidelines.^{25,27} Review Manager (RevMan) Web Version 8.1.1 was used for statistical analysis (The Nordic Cochrane Centre, The Cochrane Collaboration, Denmark).²⁸ Evaluation of continuous outcomes was done using mean difference (MD), whereas binary outcomes were examined with odd ratios. Standard deviations not provided by studies were estimated using R Statistical Software (Version 4.4.1) when means, sample sizes, and P values were available.^{29,30} Confidence interval (CI) was set at 95%, and statistical significance was established at $P < 0.05$. Heterogeneity was assessed using forest plot's visual inspection, I^2 statistics, and Cochran Q test. Outcomes were plotted using the random-effects model.³¹ A sensitivity analysis was performed for each outcome, excluding 1 article at a time, to evaluate any possible alterations in the meta-analysis overall outcome result.

RESULTS

Included Studies

As shown in **Figure 1** (Prisma Flow), out of 1,152 database results, 14 studies were eligible for full-text review. A total of 5 RCTs^{16,32–35} were included with 434 patients. Two RCTs were on midurethral slings and included 86 women with primary stress urinary incontinence, of whom 42 (48.8%) received liberal postoperative physical activity instructions and 44 (51.2%) standard of care. The other 3 RCTs focused on prolapse repair surgical procedures, with and without concomitant incontinence procedures, and

included a total of 348 women, with 170 (48.9%) patients in the liberal group and 178 (51.1%) in the restricted group. The types of prolapse procedures performed included the following: 205 (58.9%) sacrocolpopexies, 94 (27.0%) uterosacral ligament suspensions, 24 (6.9%) sacrospinous fixations iliococcygeus suspensions, and 22 (6.3%) colpocleisis. For included studies, postoperative follow-up ranged from 6 weeks presented in **Table 1** (see Supplemental Digital Content available at <http://links.lww.com/FPMRS/A567>, for surgical characteristics across included studies).

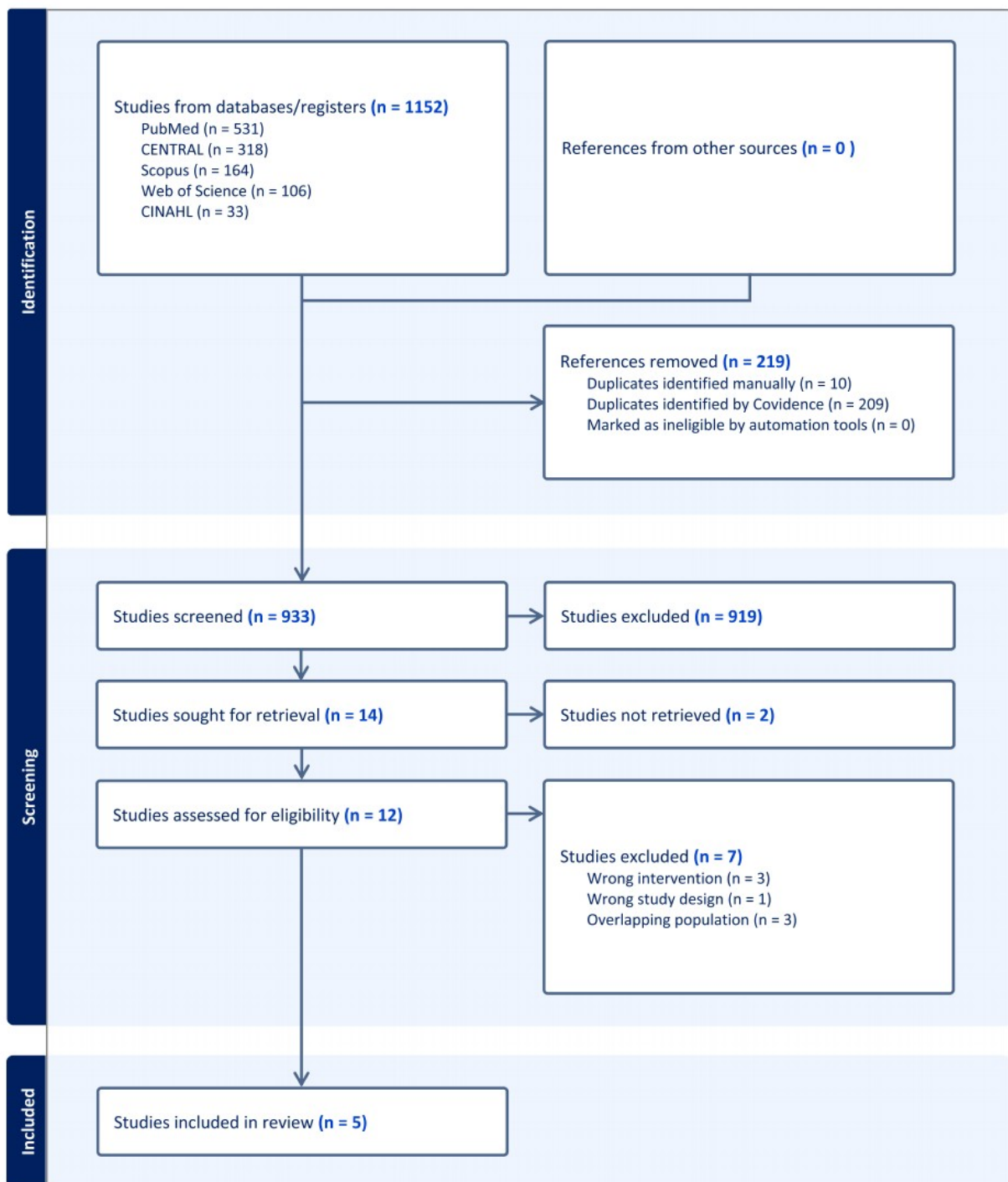


FIGURE 1: PRISMA Flow

For the definition of liberal postoperative physical activity, 4 studies recommended no restrictions on heavy lifting or aerobic exercise in the liberal group, allowing patients to

resume any physical activity after surgery as tolerated.^{16,32–34} The study by Iyer and Rane³⁵ was the only study to prescribe daily exercises for the liberal group, including jumps and knee bends. In contrast, all patients assigned to the restricted physical activity group were instructed to avoid strenuous exercise, high impact duration of these restrictions varied across the studies, ranging from 4 weeks to 3 months after surgery. Pelvic rest for 6 weeks was recommended for both liberal and standard of care groups. The exception was the study by Iyer and Rane,³⁵ which did not explicitly recommend pelvic rest in the liberal group. See Supplemental Digital Content available at <http://links.lww.com/FPMRS/A567>, for detailed instructions.

TABLE 1. Study Characteristics

Study	Study Design	Location	No. Patients:		Population	Age (y): Liberal/		BMI*: Liberal/		Postmenopausal†:	POP-Q Stage‡:		Concomitant Hysterectomy‡:		Follow-up
			Liberal/Restricted			Restricted	Restricted	Restricted	Restricted		Liberal/Restricted	Liberal/Restricted	Liberal/Restricted		
Iyer 2014	RCT (pilot study)	Australia	25/25		Primary SUI undergoing sling surgery	47.0/54.0		25.5/25.8		32.0/60.0	n/a		n/a		3 mo
Mueller 2017	RCT	United States	45/50		Stage 2 POP undergoing a minimally invasive prolapse surgery	63.1/60.53		26.3/26.5		37/32	n/a		32/35		3 mo
Anunachalam 2020	RCT	United States	72/74		Stage 2 POP undergoing a minimally invasive prolapse surgery	60.3/60.0		28.5/28.0		84.7/86.0	2: 38.6/43.2 3: 58.3/50.0 4: 2.8/6.8		50.0/54.2		6 wk
Tholemeier 2021	RCT (pilot study)	United States	17/19		Primary SUI undergoing MUS surgery with synthetic mesh	55.2/51.5		26.6/25.5		n/a	n/a		n/a		1 y
O'Shea 2023	RCT	United States	53/54		Stage 2 POP undergoing a vaginal/laparoscopic pelvic reconstructive surgery	61.8/63.8		28.8/27.1		79.2/83.3	2: 22.6/20.4 3: 6.9/72.2 4: 9.4/7.4		67.9/63.0		3 mo

*Mean.

†%.

BMI, body mass index (calculated as weight in kilograms divided by height in meters squared); MUS, midurethral sling; POP, pelvic organ prolapse; POP-Q, pelvic organ prolapse quantification; RCT, randomized controlled trial; SUI, stress urinary incontinence.

Excluded Studies

A total of 9 studies^{15,36–43} were excluded from tabulation and analysis. Three studies were excluded due to wrong intervention according to our prespecified criteria, 1 article was excluded for being an invited commentary, and 3 studies were excluded for having duplicated data and/or overlapping populations. Two studies were excluded because data were not available at the time of manuscript writing.^{16,32–35,16,32–34}

Risk of Bias of Included Studies

Risk of bias results, according to the RoB2 tool,²⁴ are summarized in **Figure 2**. As illustrated, most studies showed low risk of bias across all the assessed domains, with occasional unclear concerns. However, the study by Iyer and Rane³⁵ was rated as high risk due to bias arising from the randomization process and allocation concealment. To evaluate outcomes quality of evidence, the GRADE assessment tool⁴⁴ was used and showed moderate levels of certainty for most outcomes (see Supplemental Digital Content available at <http://links.lww.com/FPMRS/A567>). The PFDI-20 and UDI-6 scored high levels of certainty. Additionally, POPDI-6 was classified as low-level evidence, whereas rate of adverse events was categorized as very low-level evidence. Although accounting for the preliminary nature of pilot studies, for the purpose of both

assessments, all studies were classified as randomized trials due to the similar methodology in random allocation.

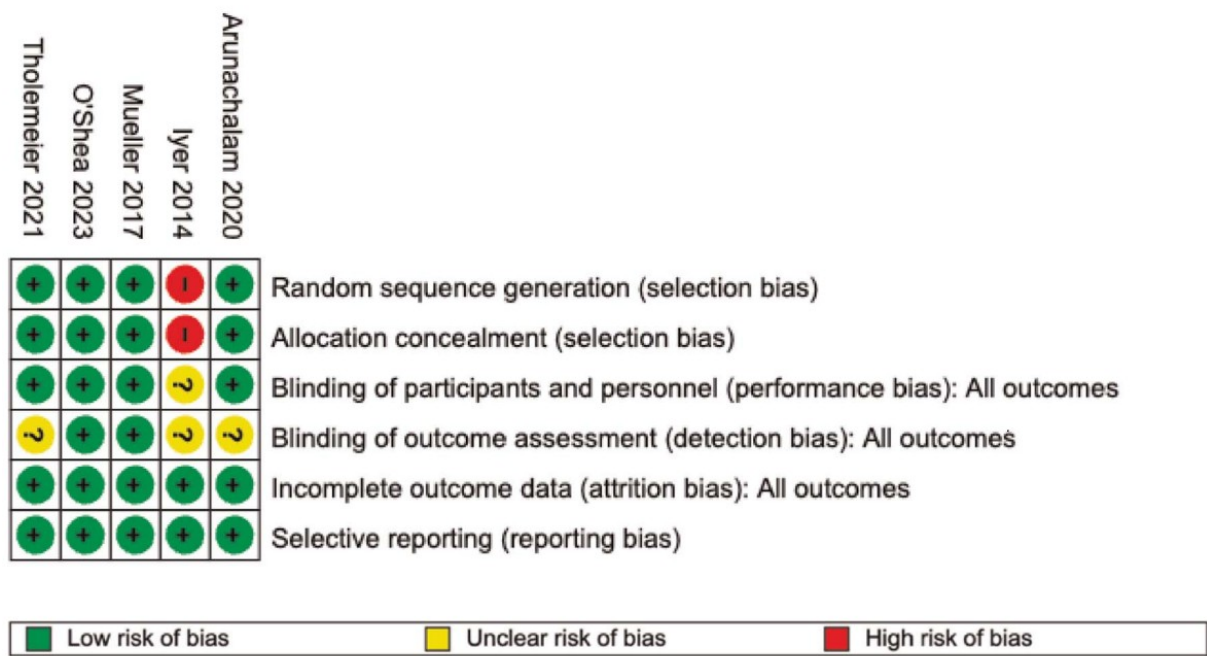


Figure 2: Risk of Bias Summary

Main Outcomes

Prolapse Surgery

Point Ba from the POP-Q assessment tool did not show a significant difference between the liberal postoperative recommendations and the standard of care group (348 patients; MD, -0.04; 95% CI, -0.16 to 0.07; $P = 0.49$; $I^2 = 0\%$) (**Fig. 3**). However, the PFDI-20 questionnaire was found to be statistically significant, favoring the liberal group (348 patients; MD, -10.09; 95% CI, -18.33 to -1.86; $P = 0.02$; $I^2 = 23\%$) (**Fig. 4**). Additionally, significant differences were observed in the UDI-6 (348 patients; MD, -4.29; 95% CI, -7.84 to -0.74; $P = 0.02$; $I^2 = 4\%$) subscale. In contrast, POPDI-6 (348 patients; MD, -3.22; 95% CI, -7.79 to 1.35; $P = 0.17$; $I^2 = 70\%$) and CRADI-8 did not indicate a significant improvement across groups (348 patients; MD, -2.35; 95% CI, -5.44 to 0.74; $P = 0.14$; $I^2 = 0\%$).

Other domains suggest that there was no significant difference between groups, including PFIQ-7 (348 patients; MD, -5.94; 95% CI, -15.79 to 3.92; $P = 0.24$; $I^2 = 20\%$) and its subscales: UIQ-7 (348 patients; MD, -2.54; 95% CI, -6.63 to 1.55; $P = 0.22$; $I^2 =$

0%), POPIQ-7 (348 patients; MD, 0.69; 95% CI, -2.32 to 3.69; $P = 0.66$; $I^2 = 0\%$), and CRAIQ-7 (348 patients; MD, -2.58; 95% CI, -6.58 to 1.42; $P = 0.21$; $I^2 = 30\%$). The same was observed for functional activity using AAS as a measuring tool (348 patients; MD, 0.43; 95% CI, -1.14 to 1.99; $P = 0.59$; $I^2 = 0\%$).

There was no difference in the rate of adverse events between the 2 groups (303 patients; odds ratio = 1.41; 95% CI, 0.62 to 3.21; $P = 0.41$), with an I^2 of 53%, suggesting moderate heterogeneity among the studies. The study by Iyer and Rane³⁵ was incorporated into this analysis due to its inclusion of concomitant procedures such as anterior and posterior colporrhaphies in their study population. See Supplemental Digital Content available at <http://links.lww.com/FPMRS/A567>, for additional graphs.

Midurethral Sling Surgery

Only 2 studies met criteria for sling surgical procedures, and they were insufficient data for a meta-analysis. Tholemeier et al³⁴ reported no significant differences in urinary symptoms (UDI-6, UIQ-7), but early improvements in health-related quality of life (HRQOL) were demonstrated favoring the liberal approach, though these were not sustained at 1 year. found no significant difference in surgical success between groups. Notably, 80% of sexually active participants in the liberal group resumed intercourse within 6 weeks, with only 3 reporting discomfort or voiding dysfunction.

Sensitivity Analysis

Omission of data from Mueller et al³² revealed no significant difference in PFDI-20 and UDI-6 subscale (253 patients; MD, -6.91; 95% CI, -15.42 to 1.59; $P = 0.11$; 253 patients; MD, -2.59; 95% CI, -6.79 to 1.60; $P = 0.23$, respectively). In the omission of data from the study by O'Shea et al,¹⁶ a significant difference was demonstrated in PFIQ-7 scale, POPDI-6, and CRAIQ-7 subscale (241 patients; MD, -12.13; 95% CI, -24.23 to -0.04; $P = 0.05$; MD, -5.29; 95% CI, -8.21 to -2.36; $P = 0.0004$; MD, -4.79; 95% CI, -9.43 to -0.15; $P = 0.04$, respectively). Removal of Arunachalam et al³³ revealed no significant difference in PFDI-20 nor UDI-6 (202 patients; MD, -10.23; 95% CI, -25.32 to 4.86; $P = 0.18$; MD, -4.88; 95% CI, -10.75 to 1.00; $P = 0.10$, respectively). For all the other parameters, reported results were not affected after consecutive exclusion.

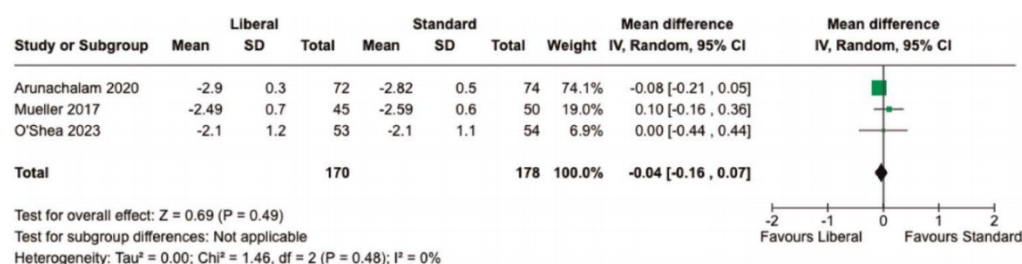


FIGURE 3. Forest plot of Point Ba on POP-Q examination after surgery.

DISCUSSION

This systematic review and meta-analysis compared the effectiveness of liberal versus restricted postoperative physical activity recommendations following reconstructive pelvic surgery. Our findings indicate that there is no significant difference in short-term anatomical outcomes between the 2 approaches up to 3 months after pelvic organ prolapse surgical procedures. Liberal postoperative care demonstrated slight benefits in disease-specific symptom relief and quality of life. There was no difference in the anterior compartment up to 3 months after surgery between the liberal and restricted postoperative groups. This suggests that liberal postoperative physical activity does not appear to compromise surgical success in terms of anatomical outcomes. These results are consistent with the findings of Ottesen et al,³⁹ who reported that nonrestricted physical activity recommendations did not influence short-term recurrence rates in pelvic organ prolapse repair. Significant improvements were observed in disease-specific symptom distress, as measured by the PFDI-20 and UDI-6 questionnaires, in those who were assigned to liberal postoperative physical activities after prolapse repair surgical procedures. These findings align with the study by Wang and Sappenfield,³⁷ which found that patients returning to normal activities earlier did not experience higher rates of complications and reported better overall satisfaction.³⁷ Nonetheless, the difference of PFDI-20 between the 2 arms was 10.09, and the incremental improvement of PFDI-20 in the liberal arm is likely not a clinically significant difference to the standard of care arm with the known minimal important change of 24 points.⁴⁵ Functional activity, assessed using the AAS tool, showed no significant difference between the groups. This indicates that liberal postoperative care does not adversely affect patients' ability to resume daily activities, further supporting the feasibility of adopting a more liberal approach. There was no significant difference in the rate of adverse events between the 2 groups. This finding is crucial as it demonstrates that liberal postoperative care does not increase the risk of complications—a concern often cited by surgeons when advocating for restrictive postoperative physical activity instructions.¹

On sensitivity analysis, removing the O'Shea study, which focused on laparoscopic and vaginal surgery, improved the association between liberal postoperative physical activity

recommendations and functional outcomes. This finding may be due to the difference in surgical approach but may also reflect regional differences in the patient population and practice patterns. Further studies focusing on a specific surgical approach are needed to further clarify the implications of liberal versus restricted postoperative physical activity recommendations. Additionally, regarding the timing of studies, it is important to note that time restrictions were not applied, thus results should be interpreted with consideration of evolving recovery protocols, yet none of the studies were published before 2014. Most studies included in this review restricted sexual activity for up to 6 weeks postoperatively in both groups, whereas Iyer and Rane³⁵ allowed earlier resumption of vaginal intercourse in the liberal group based on patient's comfort and tolerance. The rationale behind restricting sexual activity after pelvic reconstructive surgery is to protect the integrity of the surgical site and avoid placing undue stress on healing tissues. However, there is limited literature specifically addressing the effect of early resumption of sexual activity on recovery outcomes.⁴⁶ Further research is needed to explore whether more liberal recommendations may be applied for pelvic rest.

As Mueller and Kenton¹¹ noted, many physical activity restrictions lack robust evidence and consensus among surgeons. Although our findings support this view, it may be premature to recommend a shift toward less restrictive postoperative care across the board considering the limited number of studies available on this topic. However, our results suggest that this evidence could help physicians counsel patients, providing reassurance that engaging in more liberal activities within the first 3 months may not negatively affect anatomical outcomes for the type of surgical procedures studied. This reassurance may alleviate recovery concerns and support an earlier return to everyday activities and work.

STRENGTHS AND LIMITATIONS

The review followed vigorous methodology ensuring the inclusion of all available studies that met the predefined criteria, with no language restrictions. Although geographic restrictions were not applied, 4 out of 5 studies were conducted in the United States, increasing the homogeneity. Despite the efforts, there are some limitations. The limited availability of studies resulted in only a few being included and thereby a smaller number of total patients. This limitation was especially highlighted when trying to analyze according to the condition treated, as there were only 3 studies focusing on prolapse repair surgical procedures and 2 on sling surgical procedures.

As a result, the identified outcomes summary effects may have been overestimated or underestimated. Additionally, in this meta-analysis, objective surgical success was not calculated for midurethral sling surgery, since only 2 studies were available. Similarly, the direct measure of patient reported outcomes was hindered by the different

subjective outcomes across the studies. As such, we utilized the PFDI-20 scale to evaluate subjective postoperative improvement and indirectly measure subjective outcomes.

FUTURE RESEARCH

Future research should focus on conducting large-scale RCTs with standardized outcome measures and extended follow-up periods to confirm these findings and refine postoperative care guidelines. More studies are needed to examine postoperative restrictions for sling procedures, specific prolapse procedures, and evaluation of the optimal duration of pelvic rest after prolapse and incontinence procedures. Since 4 out of 5 studies were conducted in large urban areas in the United States, future studies with varied clinical settings and larger hospital catchment areas could be more generalizable.

CONCLUSIONS

In conclusion, this systematic review and meta-analysis suggests that liberal postoperative physical activity after pelvic reconstructive surgery does not compromise short-term surgical outcomes after pelvic organ prolapse surgery. More research in diverse clinical settings and focused on midurethral sling surgery is needed to develop evidence-based guidelines for postoperative care in pelvic reconstructive surgery.

ARTICLE INFORMATION

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Simply Stated

Pelvic floor disorders, such as pelvic organ prolapse and urinary incontinence, have a significant effect on the quality of life of affected individuals. Some patients will choose to undergo pelvic floor reconstructive surgery. Following surgery, traditional postoperative restrictions, such as limited weight bearing and delayed return to sexual activity, are a commonly accepted yet not widely researched area of practice.

This study sought to address this by reviewing the existing literature on liberal postsurgical activities. A total of 5 published studies met criteria for review, 2 of which focused on sling surgical procedures and 3 on prolapse surgical procedures.

Results of this study showed no significant difference between the standard and liberal approaches to postoperative care. There was a slight improvement in quality-of-life measures for patients who underwent the liberal postoperative approach following prolapse repair surgery, but it did not meet the minimal important difference threshold. However, there are limited studies with differences in the types of patients included. Overall, our findings do suggest that engaging in more liberal activities than typically permitted does not negatively affect anatomic outcomes within 3 months, for the type of surgical procedures studied. The findings of this study may potentially reduce patients' concerns regarding recovery time after surgery

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Supplemental Digital Content

Supplemental Digital Content 1: Search Strategies

Databases were searched on November 21st 2023 and July 12th 2024.- PubMed:

- #1: "Pelvic Organ Prolapse"[mh] OR "pelvic organ prolapse" OR urogynecolog* OR "pelvic reconstructive" OR "urethral sling" OR "urogynecologic surger*" OR "Pelvic floor disorders"[mh] OR "Tension-free vaginal tape"[tiab:~1] OR Midurethral sling* OR sacrocolpopexy OR Uterosacral ligament suspension OR Sacrospinous ligament fixation OR colporrhaphy
- #2 "Surgical Procedures, Operative"[mh] OR surgery OR surgeries OR surgical OR procedure* OR intervention OR operation OR operative
- #3 (#1 AND #2)
- #4 ("Gynecologic Surgical Procedures"[mh] AND "Urologic Surgical Procedures"[mh])
- #5 #3 OR #4
- #6 "Postoperative Care"[mh] OR post-operative OR postoperative OR Post-surgical OR post-surgery OR Recovery OR postop OR Convalescent care OR Convalescence[mh] OR Convalescences
- #7 #5 AND #6
- #8 "physical activity" OR "physical activities" OR expedited activity OR "unrestricted activity" OR exercises OR activity OR "Exercise"[Mesh] OR Restricted OR restriction OR restrictive OR Non-restricted OR unrestrictive[tw] OR liberal[tw]
- #9 #7 AND #8
- #10 Female OR females OR women OR woman
- #11 #9 AND #10
- #12 "Case reports"[pt] OR "Review"[pt] OR "Editorial"[pt] OR "Comment"[pt] OR "Letter"[pt] OR "News"[pt]
- #13 #11 NOT #12

Scopus search strategy: 12/12/2023

("pelvic organ prolapse" OR urogynecolog* OR "pelvic reconstructive" OR "urethral sling" OR "urogynecologic surger*" OR "Pelvic floor disorders" OR "Tension-free vaginal tape" OR "Midurethral sling*" OR sacrocolpopexy OR "Uterosacral ligament suspension" OR "Sacrospinous ligament fixation" OR colporrhaphy) AND (Surgical OR surgery OR operation OR operative) AND ("Postoperative Care" OR post-operative OR Post-surgical OR post-surgery OR Recovery OR postop OR Convalescent OR Convalescence*) AND (Exercise* OR activity OR activities OR Restricted OR restriction OR restrictive OR Non-restricted OR unrestrictive OR liberal)

Cochrane CENTRAL search strategy with 318 results (PubMed = 212; Embase = 202, CT.gov = 20; ICTRP = 9; CINAHL = 1)

Standard vs unrestricted post-op activity instruction following Pelvic reconstruction surgery_Revised 15Dec23

Last saved on: 15/12/2023 18:02:01

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Print search history

-	+	#1	MeSH descriptor: [Pelvic Organ Prolapse] explode all trees	MeSH	1002
-	+	#2	"pelvic organ prolapse" OR urogynecolog*	Limits	3849
-	+	#3	MeSH descriptor: [Surgical Procedures, Operative] explode all trees	MeSH	174359
-	+	#4	(#1 OR #2) AND (#3 OR surgery OR surgical)	Limits	2652
-	+	#5	MeSH descriptor: [Gynecologic Surgical Procedures] explode all trees	MeSH	6017
-	+	#6	MeSH descriptor: [Urogenital Surgical Procedures] explode all trees	MeSH	17460
-	+	#7	"pelvic reconstructive" OR "urethral sling" OR "urogynecologic surgery" OR "Tension-free vaginal tape" OR "Midurethral sling" OR sacrocolpopexy OR "Uterosacral ligament suspension" OR "Sacrospinous ligament fixation" OR colporrhaphy	Limits	1871
-	+	#8	(#6 OR #7) AND (Female OR females OR women OR woman)	Limits	12860
-	+	#9	#4 OR #5 OR #8	Limits	14271
-	+	#10	MeSH descriptor: [Postoperative Care] explode all trees	MeSH	5393
-	+	#11	("Postoperative Care" OR post-operative OR Post-surgical OR post-surgery OR Recovery OR postop OR Convalescent OR Convalescence*)	Limits	126349
-	+	#12	#9 AND (#10 OR #11)	Limits	2371
-	+	#13	MeSH descriptor: [Exercise] explode all trees	MeSH	39051
-	+	#14	MeSH descriptor: [Exercise Therapy] explode all trees	MeSH	21979
-	+	#15	Exercise* OR activity OR activities OR Restricted OR restriction OR restrictive OR Non-restricted OR unrestrictive OR liberal	Limits	363796
-	+	#16	#13 OR #14 OR #15	Limits	366838
-	+	#17	#12 AND #16	Limits	386
-	+	#18	Type a search term or use the S or MeSH buttons to compose	S	MeSH
				Limits	N/A

✖ Clear all

☐ Highlight orphan lines

Save this search

View/Share saved searches

Search help

Standard vs unrestricted post-op activity instruction following Pelvic reconstruction surgery_Revised 15Dec23

Last saved on: 15/12/2023 18:02:01

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Print search history

Cochrane Reviews	Cochrane Protocols	Trials	Editorials	Special Collections	Clinical Answers	More
65	1	318	0	0	2	

CINAHL – 33 results - 07/19/2024

(("pelvic organ prolapse" OR urogynecolog* OR "pelvic reconstructive" OR "urethral sling" OR "urogynecologic surger*" OR "Pelvic floor disorders" OR "Tension-free vaginal tape" OR "Midurethral sling*" OR sacrocolpopexy OR "Uterosacral ligament suspension" OR "Sacrosinous ligament fixation" OR colporrhaphy)) AND ((Surgical OR surgery OR operation OR operative)) AND (("Postoperative Care" OR post-operative OR Post-surgical OR post-surgery OR Recovery OR postop OR Convalescent OR Convalescence*)) AND ((Exercise* OR activity OR activities OR Restricted OR restriction OR restrictive OR Non-restricted OR unrestrictive OR liberal))

☐ Select / deselect all Search with AND Search with OR Delete Searches				
Search ID#	Search Terms	Search Options	Actions	
☐ S1	("pelvic organ prolapse" OR urogynecolog* OR "pelvic reconstructive" OR "urethral sling" OR "urogynecologic surger*" OR "Pelvic floor disorders" OR "Tension-free vaginal tape" OR "Midurethral sling*" OR sacrocolpopexy OR "Uterosacral ligament suspension" OR "Sacrosinous ligament fixation" OR colporrhaphy)) AND ((Surgical OR surgery OR operation OR operative)) AND (("Postoperative Care" OR post-operative OR Post-surgical OR post-surgery OR Recovery OR postop OR Convalescent OR Convalescence*)) AND ((Exercise* OR activity OR activities OR Restricted OR restriction OR restrictive OR Non-restricted OR unrestrictive OR liberal)) Show Less	Expanders - Apply equivalent subjects Search modes - Proximity	View Results (33) View Details	

Web of Science – 106 Results – 07/19/2024

Results for (("pelvic organ prolapse" OR urogynecolog* OR "pelvic reconstructive" OR "urethral sling" OR "urogynecologic surger*" OR "Pelvic floor disorders" OR "Tension-free vaginal tape" OR "Midurethral sling*" OR sacrocolpopexy OR "Uterosacral ligament suspension" OR "Sacrosinous ligament fixation" OR colporrhaphy)) AND ((Surgical OR surgery OR operation OR operative)) AND (("Postoperative Care" OR post-operative OR Post-surgical OR post-surgery OR Recovery OR postop OR Convalescent OR Convalescence*)) AND ((Exercise* OR activity OR activities OR Restricted OR restriction OR restrictive OR Non-restricted OR unrestrictive OR liberal)) (All Fields)

Supplemental Digital Content 2: Table 2. Surgical Characteristics

Table 2: Surgical characteristics

Patients' surgical characteristics	Iyer 2014	Mueller 2017	Arunachalam 2020	Tholemeier 2021	O'Shea 2023
Prior hysterectomy (Liberal/Restricted)	3 (12.0) / 3 (12.0)	13 (28.9) / 14 (28.0)	N/A	N/A	16 (30.2) / 14 (25.9)
Sacrocolpopexy (Liberal/Restricted)	N/A	25 (55.6) / 34 (68.0)	46 (63.8) / 52 (70.3)	N/A	24 (45.3) / 24 (44.4)
Uterosacral Ligament Suspension (Liberal/Restricted)	N/A	16 (35.6) / 11 (22.0)	20 (27.8) / 14 (18.9)	N/A	19 (35.8) / 14 (25.9)
Sacrospinous Ligament Fixation/Ileococcygeus Suspension (Liberal/Restricted)	N/A	N/A	N/A	N/A	9 (17.0) / 15 (27.8)
Colpocleisis (Liberal/Restricted)	1 (4) / 1 (4)*	4 (8.9) / 5 (10.0)	5 (6.9) / 8 (10.8)	N/A	N/A
Concomitant surgeries (Liberal/Restricted):					
Hysterectomy	N/A	32 (71.1) / 35 (70.0)	36 (50) / 39 (54.2)	N/A	36 (67.9) / 34 (63.0)
Incontinence	N/A	25 (55.6) / 22 (44.0)	58 (80.6) / 57 (77.0)	N/A	22 (41.5) / 21 (38.9)
Other †	17 (68) / 2 (8)	7 (15.6) / 4 (8.0)	N/A	N/A	52 (98.1) / 47 (87.0)

Values presented as N (%)

*Partial colpocleisis only

† including but not limited to anterior colporrhaphy, posterior colporrhaphy, and perineoplasty.

Supplemental Digital Content 3: List of Adverse Events as Reported

Table 3: List of Adverse Events as Reported

Adverse Event	Iyer 2014	Mueller 2017	Arunachalam 2020	Tholemeier 2021	O'Shea 2023
Clavien-Dindo Classification (Liberal/Restricted)	N/A	N/A		N/A	
Grade I			5 (6.9) / 9 (12.2)		10 (18.9) / 6 (11.1)
Grade II			2 (2.8) / 1 (1.4)		7 (13.2) / 9 (16.7)
Grade III			2 (2.8) / 2 (2.8)		0 / 1 (1.9)
Grade IV			0 (0) / 0 (0)		0 (0) / 0 (0)
Grade V			0 (0) / 0 (0)		0 (0) / 0 (0)
Other (Liberal/Restricted)		N/A	N/A	N/A	N/A
Voiding Dysfunction	2 (8) / 2 (8)				
UDO	1 (4) / 2 (8)				
Denovo UUI	4 (16) / 1 (4)				
OAB Symptoms	6 (24) / 4 (16)				
UTI	1 (4) / 0 (0)				
Groin Pain	1 (4) / 0 (0)				
Mesh Exposure	1 (4) / 1 (4)				
Dyspareunia	1 (4) / 0 (0)				
Orgasm Pain	1 (4) / 0 (0)				

Values presented as N (%).

Abbreviations: UDO, urodynamic detrusor overactivity; UUI, urge urinary incontinence; OAB, overactive bladder; UTI, urinary tract infection.

Supplemental Digital Content 4: Detailed Postoperative Instructions by Study

Table 4: Detailed Postoperative Instructions

Postoperative Instructions	Iyer 2014	Mueller 2017	Arunachalam 2020	Tholemeier 2021	O'Shea 2023
Liberal Postoperative Instructions	Daily prescribed exercises including knee bends, sit-stand, jumps, lifting (4kg to 10kg).	Resumption of daily activities is permitted, without restrictions on lifting or high impact activities, as soon as the patient can tolerate. Any type of vaginal insertion is restricted for 6 weeks (intercourse, tampons, douching).	Resumption of daily activities is permitted, without restrictions on lifting or high impact activities, as soon as the patient can tolerate. Any type of vaginal insertion is restricted for 6 weeks (intercourse, tampons, douching).	Resumption of daily activities is permitted, without restrictions on lifting or high impact activities, as soon as the patient can tolerate. Abstain from sexual intercourse for 6 weeks.	Resumption of daily activities is permitted, without restrictions on lifting or high impact activities, as soon as the patient can tolerate. Abstain from sexual intercourse for 6 weeks.
Restricted Postoperative Instructions or Standard of Care	Avoid heavy lifting and/or strenuous exercise for 4-5 weeks. Abstain from sexual intercourse for 6 weeks.	Abstain from heavy lifting (>10 lbs.) or high-impact aerobic activities for 3 months. Any type of vaginal insertion is restricted for 6 weeks (intercourse, tampons, douching).	Abstain from heavy lifting (>10 lbs.) or high-impact aerobic activities for 6 weeks. Any type of vaginal insertion is restricted for 6 weeks (intercourse, tampons, douching).	Abstain from heavy lifting (>10 lbs.), high-impact aerobic activities, cardiovascular gym machines, swimming, Pilates or yoga for 6 weeks. Abstain from sexual intercourse for 6 weeks.	Abstain from heavy lifting (>10 lbs.) for 6 weeks. Return to work after 2 weeks for sedentary work or after 6 weeks for manual labor. Abstain from sexual intercourse for 6 weeks.

Supplemental Digital Content 5: GRADE Assessment Summary

Question: Liberal postoperative activity restrictions compared to standard of care for urogynecologic procedures

Certainty assessment							№ of patients		Effect		Certainty	Importance
№ of studies	Study design	Risk of bias	Inconsistency	Indirectness	Imprecision	Other considerations	liberal postoperative activity restrictions	standard of care	Relative (95% CI)	Absolute (95% CI)		
POP-Q Tool: Point C												
3	randomized trials	not serious	not serious	not serious	serious ^a	none	170	178	-	MD 0.08 lower (0.21 lower to 0.05 higher)	⊕⊕⊕○ Moderate	
Activity Assessment Scale (AAS)												
3	randomized trials	not serious	not serious	not serious	serious ^a	none	170	178	-	MD 0.43 higher (1.14 lower to 1.99 higher)	⊕⊕⊕○ Moderate	
Pelvic Floor Distress Inventory 20 (PFDI-20)												
3	randomized trials	not serious	not serious	not serious	not serious	none	170	178	-	MD 10.04 lower (17.26 lower to 2.82 lower)	⊕⊕⊕⊕ High	
Pelvic Floor Impact Questionnaire 7 (PFIQ-7)												
3	randomized trials	not serious	not serious	not serious	serious ^a	none	170	178	-	MD 5.44 lower (14.1 lower to 3.22 higher)	⊕⊕⊕○ Moderate	
PFDI-20: Urinary Distress Inventory 6 (UDI-6)												
4	randomized trials	not serious	not serious	not serious	not serious	strong association	187	197	-	MD 4.3 lower (7.77 lower to 0.84 lower)	⊕⊕⊕⊕ High	
Adverse Events												
3	randomized trials	serious ^a	serious ^b	not serious	serious ^a	none	44/150 (29.3%)	37/153 (24.2%)	OR 1.32 (0.76 to 2.28)	54 more per 1,000 (from 47 fewer to 179 more)	⊕○○○ Very low	

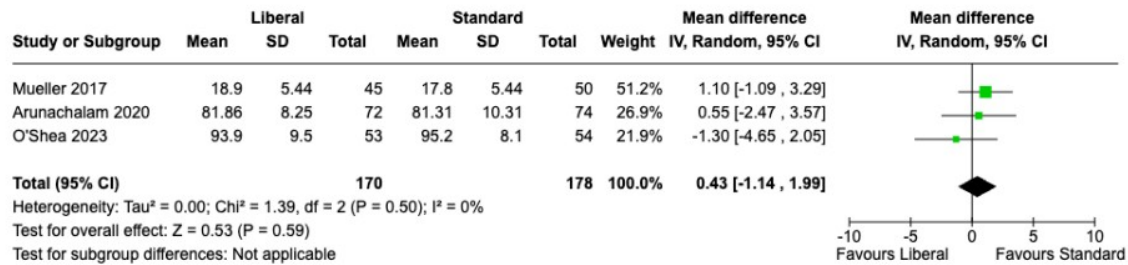
CI: confidence interval; MD: mean difference; OR: odds ratio

Explanations

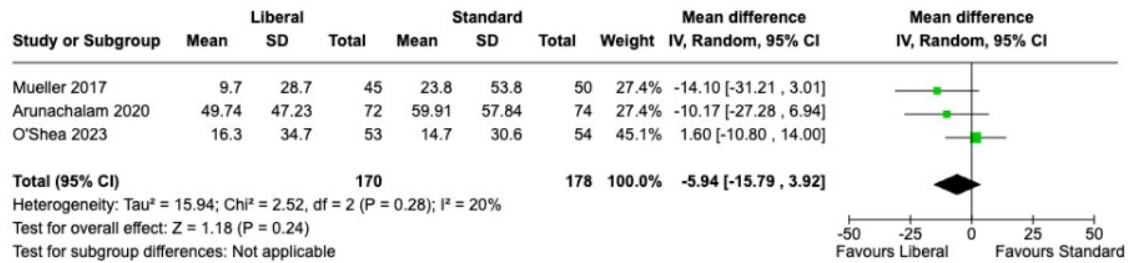
- a. Mean Difference includes 0. Downgraded by one level.
b. High heterogeneity (I² > 50%). Downgraded by one level.
c. Outcome significantly carried out by one study with high risk of bias and one study with some concerns Downgraded by one level.
d. Odds Ratio includes 1. Downgraded by one level.

Supplemental Digital Content 6: Forest Plots

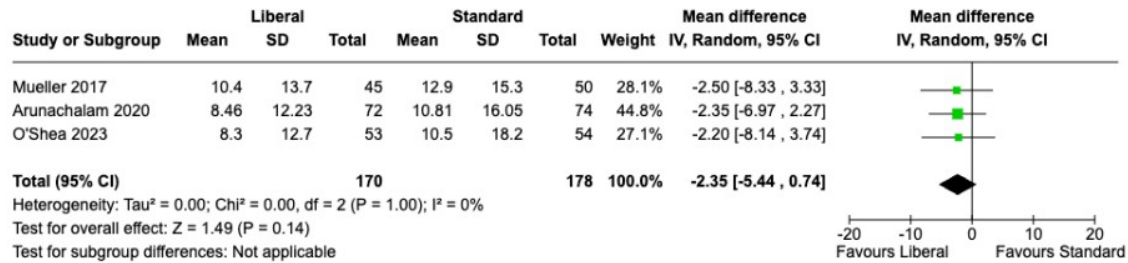
- Figure 5: Forest Plot of Functional Activity measured by the Activity Assessment Scale total score



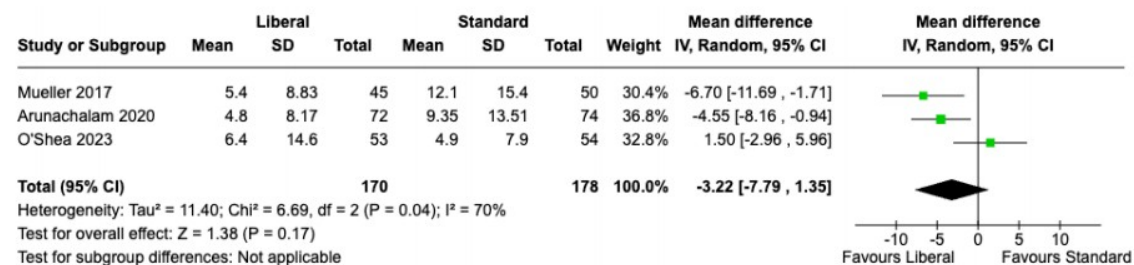
- Figure 6: Forest Plot of Pelvic Floor Impact Questionnaire-7 total score



- Figure 7: Forest Plot of Colorectal-Anal Distress Inventory-8 subscale score



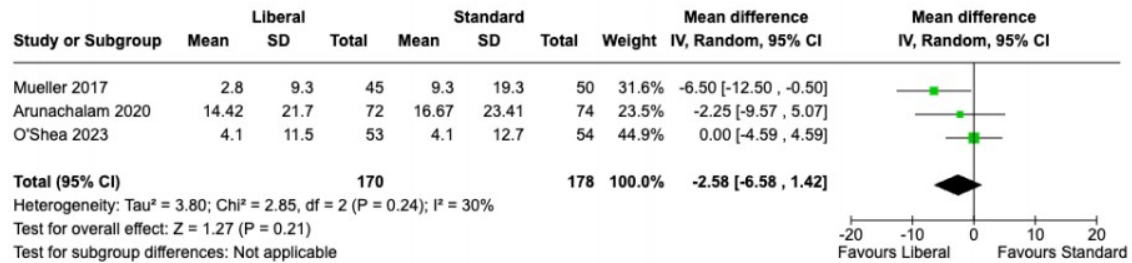
- Figure 8: Forest Plot of Pelvic Organ Prolapse Distress Inventory-6 subscale score



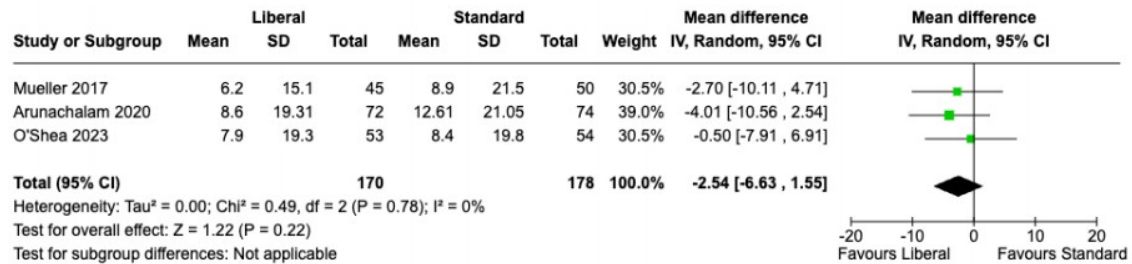
- Figure 9: Forest Plot of Urinary Distress Inventory-6 subscale score



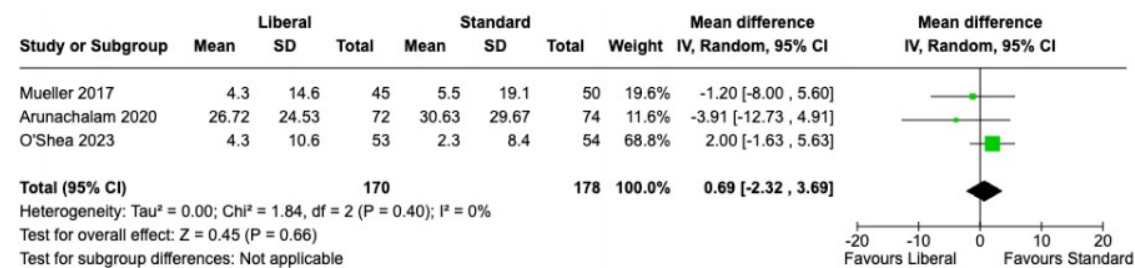
- Figure 10: Forest Plot of Colorectal-Anal Impact Questionnaire-7 subscale score



- Figure 11: Forest Plot of Urinary Impact Questionnaire-7 subscale score



- Figure 12: Forest Plot of Pelvic Organ Prolapse Impact Questionnaire-7 subscale score



- Figure 13: Forest Plot of Rate of Adverse Events

