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Return to Sport After Childbirth: Current Evidence on Pelvic Floor Dysfunction, Rehabilitation and Safe Return to Physical Activity - A Narrative Review

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Abstract

Background: Childbirth is a major physiological event that may affect women's health, functional capacity, and participation in physical activity for several months postpartum. Exercise is important in restoring physical function, psychological well-being, and quality of life.

Aim: To summarize current evidence on pelvic floor dysfunction, postpartum rehabilitation, and recommendations for safe return to physical activity and sport after childbirth.

Material and methods: A narrative review was conducted using PubMed, Scopus, and Google Scholar (2010–2025). Randomized controlled trials, cohort studies, systematic reviews, and clinical guidelines on postpartum exercise and return to sport were included and analyzed qualitatively.

Results: Postpartum pelvic floor dysfunction, including urinary incontinence and pelvic organ prolapse, is common and may limit physical activity. Pelvic floor muscle training and trunk stabilization exercises are recommended as first-line interventions. Evidence supports a symptom- and function-based approach to return-to-sport decisions rather than fixed timelines. However, heterogeneity of interventions and limited high-quality evidence, especially in athletic populations, weaken the strength of recommendations.

Conclusions: Return to sport after childbirth should be individualized and based on functional recovery and symptom resolution. Further high-quality research is needed to develop standardized postpartum rehabilitation guidelines.

Keywords: postpartum; return to sport; pelvic floor; pelvic floor muscle training; rehabilitation; physical activity; urinary incontinence; postpartum athletes

1. Introduction

Childbirth represents a major physiological event that may influence a woman's health, functional capacity, and participation in physical activity for several months postpartum. While regular exercise is widely recognized as an important component of health promotion, its role during the postpartum period extends beyond general fitness and includes recovery of physical

function, psychological well-being, and quality of life. Evidence suggests that appropriately prescribed postpartum exercise can improve cardiovascular fitness, reduce symptoms of anxiety and depression, and facilitate return to daily activities and sport participation [1,2]. However, the optimal timing, intensity, and progression of exercise after childbirth remain incompletely defined, particularly in women returning to high-impact sports and competitive athletic participation [3,4].

Over recent decades, female participation in recreational and competitive sport has increased substantially [5]. Consequently, a growing number of women seek to resume structured training and athletic performance after pregnancy and childbirth. This population includes both elite and recreational athletes, for whom physical activity is closely linked to health, psychological well-being, and social participation. This trend has led to increased attention among clinicians, physiotherapists, and sports medicine specialists regarding safe and evidence-based return-to-sport strategies in the postpartum period [3,4].

Postpartum recovery extends beyond tissue healing and involves the gradual resolution of physiological and biomechanical adaptations associated with pregnancy. Hormonal changes, connective tissue remodeling, altered neuromuscular control, abdominal wall stretching, and increased pelvic floor loading may persist well beyond delivery [5,6,7]. Although these adaptations are necessary for pregnancy and childbirth, they may also contribute to temporary reductions in physical performance and increased susceptibility to musculoskeletal and pelvic floor disorders.

Pelvic floor dysfunction is among the most frequently reported postpartum conditions and remains an area of ongoing debate regarding the relationship between physical activity and long-term pelvic floor health [8,9]. Urinary incontinence, pelvic organ prolapse, pelvic pain, and diastasis recti abdominis may substantially affect daily functioning and limit participation in both recreational and competitive physical activity [7,10,11,12,13,14]. These conditions may occur after both vaginal and cesarean delivery, although prevalence and severity vary depending on obstetric and individual factors [12].

Despite the well-established benefits of exercise, many women encounter barriers when returning to physical activity after childbirth. Concerns regarding symptom exacerbation, pelvic floor loading, and uncertainty about appropriate progression of exercise may reduce participation in the postpartum period [9,15]. In addition, limited access to specialized postpartum care and individualized rehabilitation programs may further delay recovery and return to exercise [15]. Consequently, contemporary rehabilitation approaches increasingly

emphasize individualized assessment, pelvic floor muscle training, progressive loading strategies, and function-based criteria for return to sport rather than fixed time-based recommendations [3,6,16,17].

As female participation in sport continues to grow, optimizing postpartum recovery has become an important focus of sports medicine and physiotherapy research. However, most available recommendations are based on expert consensus, observational studies, and clinical experience rather than high-quality prospective trials, highlighting the need for stronger evidence to guide postpartum rehabilitation and return-to-sport decision-making [3,4].

Therefore, the aim of this narrative review is to summarize current evidence on pelvic floor dysfunction, postpartum rehabilitation, and contemporary recommendations for safe and effective return to physical activity and sport following childbirth.

2. Materials and Methods

2.1 Literature Search and Study Selection

A narrative literature review was conducted using three electronic databases: PubMed, Scopus, and Google Scholar. The search included studies published between 2010 and 2025. Keywords used in the search strategy included “postpartum”, “return to sport”, “pelvic floor”, “pelvic floor muscle training”, “rehabilitation”, “physical activity”, “urinary incontinence”, “postpartum athletes”.

Priority was given to systematic reviews, randomized controlled trials, and cohort studies; however, relevant observational studies and clinical guidelines were also included to provide a comprehensive overview of the topic. Titles and abstracts were initially screened, followed by a full-text evaluation of potentially relevant articles.

The aim of this review was to provide a clinically relevant overview of current evidence rather than conduct a formal quantitative meta-analysis.

2.2 AI

During the preparation of this manuscript, artificial intelligence (AI) tools were used solely for language editing and structural assistance. AI support was applied to improve clarity, grammar, and academic phrasing of selected sections of the text. The author(s) independently conducted the literature search, critically evaluated the sources, interpreted the findings, and formulated all scientific conclusions. No AI tools were used for data analysis, data fabrication or the

creation of scientific results. The author(s) take full responsibility for the integrity, originality, and accuracy of the content.

3. Research results: Pelvic Floor Dysfunction After Childbirth

3.1. Physiological Changes Following Pregnancy and Delivery

Pregnancy induces a wide range of physiological, hormonal, and biomechanical adaptations that enable fetal growth and prepare the maternal body for childbirth. Significant changes occur within the cardiovascular, musculoskeletal, and endocrine systems. Elevated levels of estrogen, progesterone, and relaxin contribute to connective tissue remodeling and changes in ligament and joint properties, facilitating pelvic expansion and maternal adaptation to pregnancy-related demands [5,6,7]. These adaptations are particularly relevant for women returning to impact and resistance-based sports, where pelvic floor and lumbopelvic loading is increased.

Progressive uterine enlargement leads to changes in posture, body mass distribution, and movement mechanics. An anterior shift in the center of gravity is commonly associated with increased lumbar lordosis and altered trunk muscle activation. The abdominal wall is also substantially stretched, which may affect trunk stability and force transmission [7,14,18]. In some women, these changes are associated with diastasis recti abdominis, defined as increased inter-rectus distance along the linea alba.

The pelvic floor is exposed to continuous mechanical loading during pregnancy due to increased intra-abdominal pressure, fetal weight, and hormonal influences. These factors may reduce pelvic floor muscle function and impair the ability of support structures to tolerate physical stress [8,10,12]. Symptoms such as urinary incontinence, pelvic organ prolapse, pelvic pain, or heaviness may appear during pregnancy or postpartum.

Mode of delivery may influence postpartum recovery. Vaginal birth may involve stretching or injury of pelvic floor muscles and neural structures, whereas cesarean section involves abdominal wall disruption and surgical healing processes [12]. Although the mechanisms differ, both delivery modes may result in temporary functional impairments requiring individualized assessment before return to higher-level activity.

Recovery of musculoskeletal and pelvic floor function continues for months postpartum and involves gradual restoration of strength and neuromuscular control. This process is essential when progressing from daily activities to higher-impact and sport-specific loading.

3.2. Urinary Incontinence

Urinary incontinence (UI), defined as involuntary urine leakage, is one of the most common postpartum pelvic floor disorders. It typically occurs during activities that increase intra-abdominal pressure such as running, jumping, coughing, or lifting, making it highly relevant for return to sport.

Its development is multifactorial, involving pregnancy-related mechanical loading and possible trauma to pelvic floor muscles, connective tissues, and neural structures during vaginal delivery. Additional risk factors include higher maternal age, elevated BMI, instrumental delivery, prolonged labor, and antenatal incontinence [11,12].

Prevalence ranges from approximately 25% to 45% depending on population and assessment timing [11,12]. Stress urinary incontinence is the most common subtype, particularly in physically active women and athletes engaging in high-impact sports.

UI may also have psychological consequences, including embarrassment, reduced confidence, and avoidance of physical activity. This contributes to delayed return to exercise and sport participation.

Pelvic floor muscle training is recommended as first-line conservative management and is an essential component of postpartum rehabilitation [19,20,21].

3.3. Pelvic Organ Prolapse

Pelvic organ prolapse (POP) is the descent of pelvic organs due to impaired support from pelvic floor muscles and connective tissues [8,9,22]. It may involve the bladder, uterus, rectum, or vaginal apex.

Pregnancy and childbirth are major risk factors due to increased intra-abdominal pressure, connective tissue changes, and potential trauma during vaginal delivery [12,22].

Symptoms include pelvic heaviness, vaginal bulging, and discomfort during standing or physical exertion. Symptoms are often provoked by activities involving repetitive increases in intra-abdominal pressure such as running or resistance training [8,9,22].

Importantly, symptom severity does not always correlate with anatomical findings [8,9,22]. Current evidence does not indicate that mild-to-moderate POP is necessarily worsened by physical activity in most women [8,9].

For active women, POP symptoms may limit exercise participation and affect quality of life. Therefore, individualized rehabilitation and graded return-to-sport strategies are recommended [16,23].

3.4. Diastasis Recti Abdominis

Diastasis recti abdominis (DRA) refers to increased separation of the rectus abdominis muscles due to stretching of the linea alba. It commonly develops during pregnancy as an adaptation to uterine expansion and increased intra-abdominal pressure [13,14].

The condition is influenced by mechanical, hormonal, and connective tissue factors. Although inter-rectus distance often increases during pregnancy, postpartum recovery varies between individuals.

The clinical relevance of DRA remains debated, as evidence does not consistently show a direct relationship between inter-rectus distance and pain or functional limitation [14,18]. Therefore, assessment should focus on abdominal wall function rather than separation width alone.

DRA may influence exercise confidence and participation, particularly in activities requiring trunk stability and load transfer [15]. However, functional limitations vary widely.

Rehabilitation should emphasize motor control, progressive loading, and restoration of abdominal wall function rather than isolated reduction of inter-rectus distance [13,15].

4. Research results: Rehabilitation and Return to Sport

4.1. Pelvic Floor Muscle Training

Pelvic floor muscle training (PFMT) is widely recommended as a first-line conservative intervention for the prevention and management of postpartum pelvic floor dysfunction, although individual responses and optimal training parameters may vary [21]. Adequate strength, endurance, and coordination of the pelvic floor muscles contribute to continence mechanisms, pelvic support, and lumbopelvic stability, all of which are relevant for postnatal recovery and return to exercise. Impaired pelvic floor function is a known risk factor for urinary incontinence and other pelvic floor disorders that may limit exercise participation and negatively affect quality of life [11,12,20].

A substantial body of evidence supports the effectiveness of PFMT in reducing symptoms of urinary incontinence and improving pelvic floor function after childbirth [19,20,24]. Postpartum rehabilitation programs incorporating PFMT are therefore widely recommended as part of structured recovery pathways [6,25]. However, heterogeneity in training protocols, adherence, and outcome measures limits direct comparison between studies.

Preventive pelvic floor conditioning may also be beneficial. Women with better baseline pelvic floor function may demonstrate greater resilience to pregnancy- and childbirth-related biomechanical stress. Although pregnancy and delivery remain major risk factors for pelvic

floor dysfunction, maintaining pelvic floor health prior to conception may support postpartum recovery and facilitate earlier return to physical activity [1,2,8].

Overall, PFMT should be considered a core component of both preventive strategies and postpartum rehabilitation. Individualized assessment and supervised exercise prescription may further optimize functional outcomes and support long-term participation in physical activity and sport.

4.2. Core Rehabilitation

Core rehabilitation represents another key element of postpartum recovery. Particular emphasis is placed on activation and coordination of the deep trunk musculature, especially the transversus abdominis, which contributes to lumbopelvic stability, postural control, and load transfer during movement. These functions are important for the progressive resumption of physical activity after childbirth.

The postpartum period is often associated with altered abdominal muscle function, reduced trunk stability, and in some cases diastasis recti abdominis. As a result, rehabilitation programmes commonly include exercises aimed at restoring neuromuscular control and abdominal wall coordination. Evidence suggests that targeted exercise interventions may improve abdominal muscle function and support recovery, although optimal management strategies for diastasis recti remain under investigation [7,14,18].

Breathing mechanics are also an important component of core rehabilitation. The diaphragm functions synergistically with the transversus abdominis, pelvic floor muscles, and multifidus to regulate intra-abdominal pressure and maintain trunk stability. Accordingly, diaphragmatic and coordinated breathing strategies are frequently integrated into postpartum rehabilitation to enhance motor control and support integrated core function [8].

A combined approach incorporating core strengthening, breathing retraining, and pelvic floor muscle training may offer the greatest benefit for postpartum recovery. These adaptations are particularly relevant for activities requiring trunk stability, rotational control, and efficient force transmission between the upper and lower limbs.

4.3 Physiotherapy Interventions

Physiotherapy plays a central role in postpartum rehabilitation and return to physical activity. Comprehensive functional assessment performed by a qualified healthcare professional is essential to identify individual impairments and guide rehabilitation planning. Assessment may

include evaluation of pelvic floor muscle function, abdominal wall integrity, core stability, movement quality, and symptom provocation such as urinary leakage, pelvic heaviness, pain, or exercise intolerance.

Based on these findings, an individualised rehabilitation programme can be developed to address specific impairments while allowing graded progression of exercise intensity and load. Current recommendations emphasise that return-to-sport decisions should be based on functional recovery and symptom response rather than time elapsed since childbirth [6,25].

Education is a key component of physiotherapy care. Women should be informed about physiological changes during pregnancy and postpartum, common symptoms, and principles of progressive loading. Education may improve adherence, increase confidence in returning to activity, and support early identification of symptoms requiring further clinical review.

Overall, a combination of assessment, individualised rehabilitation, progressive loading, and education provides a comprehensive framework for postpartum recovery and return to sport.

4.4. Progressive Exercise Programs

Following restoration of basic pelvic floor function, core stability, and general physical capacity, women can progress gradually toward higher-intensity physical activity. Early rehabilitation typically includes low-impact activities such as walking, which support cardiovascular recovery while minimising pelvic floor stress.

As tolerance improves, structured progression may include resistance training, aerobic exercise, and sport-specific drills. Gradual increases in training volume and intensity are recommended to allow physiological adaptation and reduce the risk of symptom recurrence. Particular attention should be given to indicators of pelvic floor dysfunction, including urinary leakage, pelvic heaviness, or pain, which may signal excessive load progression.

Current evidence supports an individualised, symptom-guided approach to exercise progression in the postpartum period. Criteria such as absence of symptom exacerbation during impact activity, restored pelvic floor control during functional tasks, and tolerance to progressive running and resistance training should guide progression decisions [3,17]. Rather than relying on time-based criteria alone, clinicians should prioritise functional readiness and symptom response when determining progression to higher-impact or competitive sport [3,6,25].

Overall, postpartum return to sport should be viewed as a multidimensional process involving pelvic floor function, core stability, symptom status, and progressive load tolerance, rather than a fixed temporal milestone.

5. Research results: Current Recommendations

5.1. Current Return-to-Sport Recommendations

At present, there are no universally accepted international criteria for return to sport after childbirth. Current evidence indicates that return-to-sport decisions should be primarily based on functional recovery and symptom status rather than time elapsed since delivery [1]. This approach acknowledges substantial inter-individual variability in postpartum recovery and highlights the need for comprehensive assessment prior to resuming higher levels of physical activity.

Key domains for clinical evaluation include pelvic floor muscle function, core stability, load tolerance, exercise-related symptoms, and psychological readiness. Screening should also include symptoms suggestive of pelvic floor dysfunction, such as urinary or fecal incontinence, pelvic heaviness, pain, or signs of pelvic organ prolapse, as these may indicate incomplete recovery.

A multidisciplinary approach involving physiotherapists, physicians, and exercise professionals is recommended to support safe return-to-sport planning. Overall, contemporary models favour a function- and symptom-based progression model rather than reliance on arbitrary temporal milestones [4,6,25].

5.2. Return to Running

Return to running after childbirth presents a substantial physiological challenge due to repetitive impact loading on the pelvic floor and musculoskeletal system. Therefore, adequate functional recovery should be established prior to initiation of running.

Clinical recommendations commonly include a progression of functional tasks performed without pain or pelvic floor symptoms, such as 20–30 minutes of walking, single-leg squats, forward lunges, short bouts of jogging on the spot, and low-level hopping drills. These tasks assess tolerance to impact loading and neuromuscular control.

In addition to functional testing, assessment of pelvic floor function, core stability, and movement quality is recommended. A gradual, symptom-guided progression from walking to running should be adopted, with training load adjusted according to individual response [26]. The emergence of urinary leakage, pelvic pain, or heaviness should prompt reassessment and modification of training.

Thus, return to running should be understood as a graded rehabilitation process guided by functional capacity and symptom response rather than fixed postpartum timelines [6,16,25].

5.3. Return to High-Impact Sports

Return to high-impact sports requires progressive and individualised rehabilitation to ensure adequate recovery of pelvic floor, abdominal wall, and neuromusculoskeletal function [3].

Rehabilitation should begin with low-load activities, with gradual progression in intensity, volume, and complexity. Particular attention should be given to breathing strategies and intra-abdominal pressure regulation, as excessive pressure may increase stress on pelvic floor structures.

Ongoing symptom monitoring is essential throughout progression. Urinary incontinence, pelvic heaviness, pain, or vaginal bulging may indicate that training load exceeds current capacity and requires modification.

Progression to high-impact sport should therefore be guided by functional performance, symptom-free exercise tolerance, and clinical assessment rather than time-based criteria. Although progressive loading appears safe when appropriately managed, high-quality sport-specific evidence on return-to-performance strategies remains limited [6,16,25].

5.4. Barriers and Challenges

Return to sport after childbirth is influenced by multiple physical, psychological, and environmental barriers. Fatigue is commonly reported in the early postpartum period and may be exacerbated by sleep disruption related to infant care. Musculoskeletal pain, including low back and pelvic girdle pain, may further limit physical activity participation.

Practical constraints such as time limitations and childcare responsibilities often reduce consistency in training and rehabilitation adherence. Social support plays a key role in mitigating these barriers.

Psychological factors, including postpartum mood disturbances, anxiety, reduced self-efficacy, and fear of symptom exacerbation, may further influence exercise behaviour and confidence in returning to sport.

Therefore, effective return-to-sport strategies should adopt a holistic approach addressing physical, psychological, and environmental factors. Education, structured support, and individualised planning may improve adherence and long-term physical activity participation [1,4].

5.5. Research Gaps

Despite increasing interest in postpartum rehabilitation, high-quality evidence on optimal return-to-sport strategies remains limited. Existing literature is heterogeneous in design, population, and outcome measures, limiting the development of standardised guidelines.

A major gap is the absence of universally accepted, evidence-based return-to-sport criteria following childbirth. Current recommendations are largely based on expert consensus and extrapolation from related populations, resulting in variability in clinical practice.

Further longitudinal and interventional studies are required to evaluate long-term outcomes of rehabilitation strategies, particularly in athletic populations. Additional research should clarify the relationship between pelvic floor function, core stability, and high-impact loading, as well as identify objective markers of readiness for sport.

Future work should prioritise development of validated, sport-specific return-to-sport frameworks and evidence-based clinical thresholds for postpartum athletes.

6. Discussion

The findings of this review highlight that return to sport after childbirth is a multifactorial process requiring an individualized and function-based approach. Current evidence indicates that postpartum recovery cannot be defined solely by time elapsed since delivery, as physiological, musculoskeletal, and psychological changes vary considerably between individuals. Accordingly, functional assessment and symptom-guided progression are considered essential components of safe return-to-sport strategies.

Pelvic floor dysfunction remains a key clinical consideration in the postpartum period. Urinary incontinence, altered pelvic support, and reduced neuromuscular control may significantly affect exercise participation and performance. The available literature supports pelvic floor muscle training as a first-line conservative intervention; however, variability in training protocols and adherence may influence outcomes [19,20,24]. These findings underscore the importance of integrating pelvic floor rehabilitation into postpartum care pathways.

Core stability and abdominal wall function also play an important role in postpartum recovery. Changes in the function of the trunk musculature, including the transversus abdominis, and the presence of diastasis recti abdominis may influence lumbopelvic control and load transfer during movement. Exercise-based interventions appear beneficial for improving abdominal function; however, the optimal rehabilitation strategy for diastasis recti remains inconclusive, highlighting the need for further high-quality research [7,14,18].

Progressive return to running and high-impact sport is increasingly supported by expert consensus, although empirical validation of specific functional thresholds remains limited. Current recommendations suggest that progression should be guided by functional readiness, symptom response, and load tolerance rather than arbitrary postpartum timelines [6,25]. Functional testing and graded exposure to impact loading are commonly recommended to support safe progression.

Despite growing evidence, important gaps remain in the standardisation of postpartum return-to-sport protocols. Heterogeneity in study designs and outcome measures limits the development of universal guidelines. There is a need for validated, sport-specific criteria incorporating both objective functional measures and patient-reported outcomes. Furthermore, limited long-term data in athletic and elite populations restrict the development of performance-specific recommendations.

Overall, return to sport after childbirth should be understood as a continuum of recovery rather than a fixed endpoint. A multidisciplinary approach involving physiotherapists, physicians, and exercise professionals is essential to support safe and sustainable return to physical activity and sport.

7. Conclusions

Childbirth has a significant and lasting impact on pelvic floor and abdominal wall function, which may influence physical performance and the safe resumption of exercise. Inappropriate or poorly guided return to sport may be associated with an increased risk of pelvic floor dysfunction and delayed functional recovery.

A structured, multidisciplinary rehabilitation approach is essential to support postpartum recovery. Pelvic floor muscle training, core strengthening exercises, and progressive, symptom-guided loading strategies represent key components of evidence-based postpartum care and are recommended to be integrated into rehabilitation pathways.

Return to sport after childbirth should be guided by an individualized, function-based framework that considers physical capacity, symptom response, and psychological readiness rather than arbitrary time-based milestones. This approach better reflects the heterogeneity of postpartum recovery and aligns with contemporary sports medicine principles.

Despite increasing clinical attention in this area, there remains a lack of high-quality evidence defining standardized return-to-sport criteria, particularly in athletic and high-impact sport

populations. Future research should focus on developing validated, objective markers of readiness to safely resume physical activity after childbirth.

Disclosure

The authors report no disclosures.

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