Return to Rugby Postpartum Guidelines:

Elite pathway

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Content

1. **Introduction**

1.1 Background

Participation in Women's rugby is increasing globally and there is a growing number of female players returning to rugby following childbirth. However, currently no guidelines exist to support postpartum players return to rugby safely and effectively. Pregnancy, childbirth and the postpartum period can lead to many physiological, psychological and social changes for a player, such as physical deconditioning, perineal and or abdominal wall trauma, postpartum mental health concerns and the need for additional support to cope with the demands of motherhood (1). Whilst there is some knowledge of the changes females can go through, there is a scarcity of literature and guidance in supporting female athletes to return to sport, in particular one involving contact (2). This gap in policy and guidance needs addressing as being an athlete and becoming a mother should not be mutually exclusive. Initial studies within postpartum return to sport have focused on returning to running (3-6). However, there is a lack of information regarding how to safely return a player to high impact, collision-based sports, such as rugby.

Rugby places high demands on players in terms of the loads they need to be able to produce and withstand both in the upper and lower body regions. Many of the activities a rugby player is exposed to (e.g., tackle events, scrummaging, lifting during line-outs, landing from line-outs, accelerating/decelerating, high speed running, weight training) result in large forces (7-9) being transferred either directly to the abdominal and lumbopelvic region or indirectly from load being transferred through the body (e.g., external load applied to the upper or lower limb). These forces likely produce high intra-abdominal pressures that players must withstand (10-12). In particular, the pelvic floor muscles potentially incur high loads as a result (13, 14). The unique combination of pregnancy, childbirth and exposure to rugby may increase a postpartum player's risk of pelvic floor dysfunction. Return to rugby postpartum guidelines must consider these factors and appropriately prepare players for their return.

At present, the limited return to sport literature has identified several factors to consider following pregnancy and childbirth (e.g., fear of movement, pelvic floor dysfunction and, returning too early and injury susceptibility)(6, 15-17). The postpartum return, in most cases, will also be completed whilst navigating the physiological, psychological and social challenges of motherhood (e.g., breastfeeding, sleep deprivation, childcare)(17). Consequently, a whole-systems, biopsychosocial approach should be applied when supporting postpartum rugby players (1). It is important to note that any pregnancy, including loss (stillbirth, miscarriage or abortion), will elicit physiological and psychological responses and therefore an individualised approach for all women is advised.

The Postpartum Return to Rugby World Rugby Working Group sought to develop return to rugby postpartum guidelines to enable a safe and effective return to rugby following childbirth. Emerging evidence from the experiences of recreational and elite athletes identifies very little is known regarding how to return to sport postpartum. This lack of knowledge can deter or prolong an athlete's return to sport and result in insufficient support to return (15-18), highlighting the need for these guidelines. The evidence base for postpartum return to sport, rugby specifically, is scant and therefore this document is based upon the best available evidence alongside an experienced multi-disciplinary diverse panel who independently reviewed the pathway and proposed recommendations.

These evidence-informed guidelines are for players, coaches and multidisciplinary team clinicians. They represent a starting point for the safe and effective return to rugby for the postpartum player, with a review process in place to ensure the recommendations remain current and evidenced informed. They will be publicly available through World Rugby, aiming to support all governing bodies

and players to safely and effectively return to play despite disparities that may be present regarding financial and personnel resources across Unions and countries.

1.2 Overview of guidelines

The return to rugby postpartum guidelines are based on the return to sport postpartum framework (3). The guidelines consist of six phases in total: 1) Recover; 2) Review; 3) Recondition; 4) Return to non-contact training; 5) Return to contact training and; 6) Return to play. The six phases consist of specific focus areas including *Pelvic floor, Strengthening, Conditioning, Skills, Breast health and Milestones* to give a comprehensive approach to guide clinicians and players through their recovery journey. Exercise suggestions are provided within each stage. These serve as a guide and are not intended to be viewed as prescriptive or an all-encompassing list of exercises. If a supervising clinician is present, they should use clinical judgement to tailor exercises considering the athletic and maternal history, and current presentation of the player (e.g., musculoskeletal pain and or pelvic floor dysfunction symptoms). Players can proactively prepare for their postpartum return during pregnancy, the 'Ready' phase of the 6 Rs postpartum framework (3, 6). However, separate guidance will be produced for Pregnancy.

Each player's return will vary and whilst timescales have been included within the guidelines, they are a minimum guide. The authors acknowledge that those in elite environments may accelerate through stages more quickly if under supervision but reiterate that progress is player, symptom, and function specific.

Postpartum return to play requires an individualised, whole-systems biopsychosocial approach with graded exercise progression, like the management of return to sport after musculoskeletal injuries (1). The key physical qualities of rugby such as strength, power, high speed running, game contact and decision making are difficult to preserve through pregnancy therefore supporting clinicians need to consider the time away from rugby training through the antenatal period and the effect this will have on conditioning, confidence and skills capabilities. As a whole-systems, biopsychosocial approach is used within the guidelines, a multidisciplinary support team is advocated through the elite pathway. Additionally, we recommend constant evaluation of signs and symptoms related to all aspects of physical and mental health due to the continually evolving demands of both rugby return to play and motherhood.

1.3 Guideline development

The core working group consisted of Joanna Perkins (Welsh Rugby Union; musculoskeletal sports physiotherapist), Dr Isabel Moore (Cardiff Metropolitan University; human movement and sports medicine scientist), Gráinne Donnelly (private practice; pelvic health physiotherapist) and Dr Araba Chintoh (World Rugby Women's Player Welfare Steering Group; psychiatrist and ex-player). This group were responsible for: 1) performing a narrative review of the relevant literature, which was not limited to specific study designs and included non-sport postpartum populations and rugby and sport medicine concepts, due to the lack of postpartum-sport specific research; 2) formulating the milestones and key recommendations and; 3) writing the guidelines. The Royal College of Obstetricians and Gynaecologists' classification of evidence levels were used when developing *key recommendations* and the Appraisal of Guidelines Research and Evaluation (AGREE) checklist was used to inform the reporting of our guidelines. The guidelines will be updated every five years or sooner if key relevant evidence is published and will involve systematic searches as the evidence base grows.

A wider, external group reviewed the guidelines and recommendations. This group consisted of: Aisling Byrne (Rugby Football Union; musculoskeletal physiotherapist), Lucy Clarke (Hong Kong and

China Rugby; clinical governance); Dr Celeste Coltman (University of Canberra; biomechanist), Dr Margie Davenport (University of Alberta; physiologist), Dr Andrea Faull-Brown (University of Worcester; sports psychologist), Celeste Goodson (medical exercise specialist), Dr Leigh Gordon (medical physician specializing in sport and exercise medicine), Rose Hopewell-Fong (Hong Kong Rugby; player), Dr Lewis Jones (Rugby Football Union; medical physician specializing in sport and exercise medicine), Kerin Lake (Wales and Gloucester-Hartpury Women; player), Professor Margo Mountjoy (McMaster University; medical physician specializing in relative energy deficiency in sport and mental health), Dr Danielle Salmon (World Rugby; concussion scientist), Emily Ross (Rugby Football Union; musculoskeletal physiotherapist), Abbie Ward (England and Bristol Bears Women; player).

All wider group members were asked to provide feedback on the guidelines, particularly addressing the areas of their expertise, improving the quality of the work, rating how appropriate the milestones and key recommendations were and the practicalities of implementation. The feedback and ratings were used to revise the guidelines and recommendations (Appendix A). Players were part of the wider, external group (patient/public involvement). They were asked to provide feedback on the progressions being recommended at each stage of the return to rugby pathway and the appropriateness of the exercise examples. They were also invited to review the entire document and provide feedback on it if they wished to do so. If they reviewed the entire document, they were asked to provide ratings as per the other wider, group members.

1.4 Care pathways

The Working Group identified two care pathways, based on the clinical support available and access to resources (e.g., health services) due to socioeconomic factors. The two care pathways are: **Elite and Community.** Separate guidelines were produced for each pathway.

Elite refers to players who have: 1) a medically supervised and multidisciplinary rehabilitation programme; 2) access to pelvic health services and 3) access to in person, supervised rehabilitation.

Community refers to players who will need to lead their own rehabilitation process due to a lack of access to supervised rehabilitation and pelvic health services.

1.5 Applying the elite pathway guidelines

This document covers the return to rugby postpartum Elite pathway. Details pertaining to each phase and relevant literature are provided. It is recommended that the player have a lead supporting clinician to guide them through their rehabilitation (clinician supervised care). It is important to have early discussions with the player and coaches to discuss and set goals, expectations, and practical considerations of the return to play process either during pregnancy or following childbirth. They should then have regular review points with the player, at the beginning of each phase as a minimum, to ensure all milestones have been completed before progression is made. A checklist for return to rugby postpartum is provided to enable clinicians to monitor rehabilitation progression (see Appendix B).

The pathway advocates a symptom led approach. The absence of symptoms should not mean that phases are skipped or accelerated as they are based on physiological healing time frames as well as time to regain sufficient strength, conditioning and skill levels for a safe and effective return. This will vary for every woman depending on pre-delivery fitness, delivery mode and any complications. Further, all players should begin their return to play at stage one, regardless of how many weeks post-delivery they are. For players beginning their return after tissue healing and or the 4th trimester (defined in this document as the first 12 weeks following delivery), they may transition through phases one and two quicker than those beginning whilst tissue healing is still ongoing. Finally, these

guidelines are for those players who want to return to rugby postpartum. Not all players may choose to return to rugby. If such players want to return to exercise and do not have access to a multidisciplinary support team the community guidelines can be followed to inform their return.

National rugby governing bodies and or clubs are encouraged to provide financial support to cover health services that are not provided by the 'in-house' medical team overseeing a postpartum player's return to rugby (e.g., lactation consultants, pelvic health physiotherapists) and childcare (e.g., babysitters, travel for family/friend). In addition, they should facilitate the creation of peer-support groups for postpartum players. Key take-home messages for the Elite return to rugby pathway are shown in Table 1.

Table 1. Key take home messages for the Elite return to rugby postpartum pathway

Key messages for the Elite return to rugby postpartum pathway
1. Return to play progression should be individualised and goal orientated 2. Progression should be based on symptoms, function and healing timescales (see Appendix B) 3. There should be regular evaluation of physical and psychological signs and symptoms throughout each phase 4. Players can regress through stages if new symptoms present. Such symptoms require assessment and may limit progression 5. A multidisciplinary approach is advocated with the player at the centre of return to play decision-making

2. Phase 1 (Recovery)

Phase 1 is focused on recovery from pregnancy and childbirth, screening for complications and providing focused education aiming to facilitate healing and reduce any presenting pain (Table 4). Ongoing pain should not be considered normal and should limit progression into Phase 2. The supporting medic or physiotherapist should complete a thorough subjective assessment to understand the players' pregnancy, delivery, and current status. A suggested proforma is in appendix 1. Physical therapy can begin early in the 4th trimester, with the initial 6-week period being a valuable time for directed and supported rehabilitation. Traditional injury recovery concepts should be encouraged to support postpartum tissue healing (e.g., rest, nutrition, and hydration). The player can complete small bouts of progressive activities of daily living (e.g., walking) as symptoms allow and gentle mobility, pelvic floor and abdominal exercises. Attention should be made to efficient and varied strategies when carrying out repetitive activities of daily living in the early postpartum period (e.g., lifting and holding the baby to support the healing abdominals and pelvic floor).

Phase 1 allows for early screening of the athlete, which will continue throughout the pathway. Sports medicine multidisciplinary members should be aware of red flag signs and symptoms, which may present postpartum.

These include pelvic masses, neurological signs and symptoms (e.g. cauda equina, pudendal nerve injury), persisting vaginal bleeding, postpartum or persisting urinary retention and any signs of infection such as spiking a temperature, foul smelling discharge, strong smelling and painful voiding, persisting and/or progressive abdominal pain, feeling systemically unwell (19), and postpartum hypertension.

Understanding the social support systems a player has is important when designing an individualised return to rugby programme. Every player's situation will differ and National Governing bodies should, where possible, fund tangible support (e.g., childcare, associated travel costs for a career).

The focus areas in Phase 1 differ to subsequent phases and include: *Pelvic floor, abdominal wall, birth considerations, breast health, mental health and nutrition.*

2.1 Pelvic floor

The pelvic floor refers to the group of muscles forming a layered sling of support at the base of the pelvis. The pelvic floor muscles serve to maintain continence and facilitate emptying of the bladder and bowel, support the pelvic organs, and enable sexual function (20). It comprises approximately two thirds slow-twitch muscle fibres and one third fast-twitch muscle fibres (19) and it functions through a constant state of muscular activity, responding as necessary to manage varying load demands (19, 21). Working with the muscles of the abdomen, spine and diaphragm, the pelvic floor supports trunk movement and intra-abdominal pressure management.

The pelvic floor experiences physical and physiological changes during all pregnancies and following vaginal childbirths. Specifically, the pelvic floor muscles and genital hiatus (the gap in the pelvic floor allowing passage of the urethra and vagina) lengthen and widen during pregnancy and experience further stretch and trauma during vaginal childbirth. This means that all postpartum women require reconditioning of their pelvic floor muscles.

When the pelvic floor muscles are unable to carry out their role and tolerate the load applied to them, they can present with symptoms including urinary or faecal urgency or incontinence, difficulty emptying the bladder or bowel, pelvic organ prolapse, pain and sexual dysfunction, collectively known as pelvic floor dysfunction (PFD) (Table 2) (19, 22). If players experience any symptoms listed in Table 2 they are advised to speak to a pelvic health physiotherapist or should be signposted to one. Risk factors for developing symptoms of pelvic floor dysfunction include modifiable factors (e.g. higher body mass, constipation, impact and strenuous activity) and non-modifiable factors (e.g. increasing age, higher maternal age, pregnancy, childbirth, assisted vaginal births)(19).

Table 2. Signs and symptoms of pelvic floor dysfunction and symptoms to slow down exercise progression and or regress exercise in any phase of return to rugby postpartum

Signs and symptoms of pelvic floor dysfunction	**Symptoms to slow down exercise progression and or regress exercise**
Urinary or faecal incontinence	Ongoing (beyond 6 weeks postpartum) or onset of vaginal bleeding not related to menstrual cycle, during or after exercise
Urinary or faecal urgency	Signs and symptoms of pelvic floor dysfunction prior to or during exercise in each phase
Pressure/bulge/dragging/heaviness in the vagina	Musculoskeletal pain related to exercise
Obstructive defecation	Caesarean section surgical site pain or symptoms
Pain with intercourse/use of tampons	
Pelvic pain	

Pelvic floor muscle training (PFMT) is effective for reducing symptoms of urinary incontinence in female athletes (23), yet 1 in 4 females do not recruit their pelvic floor muscles correctly (24). For this reason, supervised pelvic floor muscle assessment and training with a specialist pelvic health physiotherapist is recommended as the first line management for symptomatic women (22, 25-27). Given that pelvic floor dysfunction is more prevalent in athletes playing high impact sport compared to low impact sport (28), appropriate pelvic floor screening for rugby players is vital throughout all phases.

Targeted PFMT can begin as early as day 0 postpartum (Table 3). However, if a player has a catheter in-situ they should wait until it is removed before beginning PFMT. It is important to understand that knowing *how* to activate and train your pelvic floor is not an easy task. Different cues will resonate with different individuals and may include, but are not limited to asking a player to imagine:

- "Stopping gas escaping"
- "Stopping the flow of urine mid-flow"
- "Closing a zipper from back passage to front passage"

Initial PFMT will involve carrying out a few gentle repetitions and progressing towards achieving one to two repetitions of rapid pelvic floor muscle recruitments alongside three sets of 8 to 12 sustained close to maximum contractions repeated daily (19). Players may find PFMT easier in different positions or against a hard surface in sitting for example to gain an additional sense of feedback of an effective contraction. Pelvic health physiotherapists may not be part of the current sports medicine team and arrangements should be put in place to ensure that any rugby player who requires specialist evaluation can access it. The involvement of a pelvic health physiotherapist may be constrained by funding and accessibility. Therefore, clinicians in the elite pathway should also be proactive in the ongoing screening and support for their athletes. Validated questionnaires can be used such as the Australian pelvic floor questionnaire (29).

Players should initially be educated on the anatomy and function of the pelvic floor as evidence has shown those with enhanced understanding were 57% less likely to develop urinary incontinence (30). This education should include bladder and bowel hygiene strategies to minimise constipation (which will add increased strain to the healing pelvic floor) and bowel emptying strategies such as feet being elevated on a stool. Education should also include the significance of rest, reducing fear of movement, sleep hygiene and nutrition. Athletes should consider PFMT as they do any other key muscle group in their strength training programme. The importance of engaging in PFMT and following a focused, individualised and progressive programme is recommended in the return to rugby process as the efficacy of PFMT is well documented for the prevention and management of PFD (26, 31, 32). A generic exercise prescription is detailed through this pathway.

2.2 Abdominal wall

During pregnancy, all the muscles of the anterior abdominal wall endure progressive and sustained stretch and pregnancy-related loading. Therefore, all postpartum players will have abdominal wall reconditioning needs and should be guided through graded abdominal wall strengthening. In addition, all pregnant women will experience some degree of widening at the linea alba by the last few weeks of pregnancy (33). For the majority of women, this widening naturally resolves by 8-12 weeks postpartum (33). However, in approximately one third of women, they experience excessive thinning and widening of the linea alba that does not naturally resolve (34) and this is referred to as diastasis rectus abdominis (DRA) (35). It often presents with accompanying signs including a persisting pendular appearance of the abdominal wall and the presence of doming, bulging or sinking in at the midline during abdominal exertion. Research is limited on DRA, and specifically investigating

its impact on different sports. However, it has been shown to have widespread biopsychosocial implications including reduced quality of life due to compromised physical health and functioning, poorer physical perception, lower body image satisfaction and higher degrees of abdominal pain that is frequently perceived as discomfort or bloating (34).

Considering that rugby places high demands on the abdominal wall muscles and connective tissues, it is important that postpartum women engage in graded abdominal strengthening and reconditioning and that they are screened for DRA. These guidelines advocate for this assessment at the initial postpartum review in Phase 2 (36). Depending on resources available this may include calipers, ultrasound or objective assessment by a physiotherapist. However, the presence of DRA at this point is not concerning and the abdominal wall is potentially still undergoing natural resolution. Additionally, the presence of DRA is unlikely to prevent or delay a player returning to training or engaging in competition. Conservative interventions may have a negligible effect on reducing DRA in postpartum women (37) and there is no evidence-informed, specific exercise programme to follow (38). Therefore graded, individualised and progressive abdominal wall muscle strengthening is considered best practice and should be commenced early in the pathway.

Further abdominal wall considerations include umbilical hernias and subcutaneous wall defects which should be referred for ultrasound imaging if suspected and prior to contact training. Persisting DRA that does not respond to conservative rehabilitation, yet still causes symptoms, distress or dysfunction should be referred to an appropriately qualified surgeon (e.g. plastic surgeon or general surgeon with experience in DRA repair) for surgical opinion. Players should not elect for surgical repair prior to two years postpartum. If elected, a comprehensive plan should be in place to support the player through the demanding post-operative recovery phase, which can span up to one year.

2.3 Birth considerations

2.3.1 Caesarean section

Approximately 1 in 5 women deliver via abdominal caesarean section, although there is considerable variation in the prevalence of caesarean section worldwide (39) and it can be influenced by many factors including health system policy and environment. Considering that caesarean section involves major abdominal wall surgery, the recovery phase is likely to last longer than uncomplicated vaginal delivery modes and requires consideration of postpartum wound and tissue healing (2). The degree of tissue trauma, as well as perceived birth trauma, experienced by individuals following caesarean section will vary depending on individual cases. For example, some women may progress through labour, attempt stage 2 delivery yet end up in an emergency caesarean section. Furthermore, the medical risk to a mother and or child's life may dictate the time needed during the recovery phase.

Scar pain, both local and radiating, can occur post-caesarean secondary to several biopsychosocial influences including, but not limited to, to adhesions, infection or birth trauma. Physiotherapy post-caesarean can be effective in reducing pain through various approaches that aim to facilitate neuromodulation (40, 41), although it is advised that players are cleared by their healthcare provider before they commence more vigorous exercise. Clinicians can consider scar massage work once sufficient healing has taken place, typically after 6 weeks, although massage away from the scar can be commenced before this time (42).

2.3.2 Episiotomy and 1st and 2nd degree tears

An episiotomy is a surgical incision of the perineum and the posterior vaginal wall that is generally performed by a midwife or obstetrician and aims to lower the risk of significant perineal trauma during vaginal childbirth. Many women will experience minor perineal tearing during vaginal childbirth. This can range from small grazes or tears affecting the skin (1st degree) to tears affecting the muscle of

the perineum and the skin (2nd degree). More significant tearing (3rd and 4th degree) will be discussed further below. Both episiotomies and 2nd degree tears will require suturing. They are unlikely to cause long-term problems, however they can be very sore and appropriate consideration for tissue healing is necessary in the early postpartum weeks.

2.3.3 Obstetric Anal Sphincter Injury

Significant perineal trauma (3rd and 4th degree) is referred to as obstetric anal sphincter injury (OASI) and occurs in approximately 3 in every 100 women during vaginal childbirth. OASI refers to a tear in the perineum that extends into the anal sphincter complex (43). For some women, OASI can lead to long-lasting complications including difficulty controlling their bowels or holding in wind. OASI are always repaired by an Obstetrician in theatre and should involve postpartum follow-up with the obstetrics team. A player who has experienced an OASI needs to be given consideration for their postpartum perineal recovery and pelvic floor function. Liaison with the multidisciplinary obstetrics team may be appropriate in planning return to rugby and particular attention to symptoms of pelvic floor dysfunction should be monitored following their return.

2.3.4 Medical complications

Any identified medical complications during pregnancy, childbirth or postpartum should be monitored and managed accordingly with the appropriate medical professional. For example, players who were diagnosed with gestational diabetes or obstetric cholestasis should be followed up by an appropriate medical professional (e.g. GP, Obstetrician) to ensure their medical symptoms resolve postpartum.

Table 3. Example exercises for Phase 1 (recovery) of return to rugby postpartum

Focus	**Examples**
Pelvic floor	PFMT in varied positions (e,g., lying, side lying, sitting, standing)
	Diaphragmatic breathing
Abdominal wall	Low load abdominal muscle contractions in varied positions. This can be facilitated with a ball squeeze, band pull or arm raise for example
Mobility	Pelvic tilts, knee rolling, thoracic mobility, pectoral stretches, hamstring/gluteal/quadriceps stretches

PFMT = pelvic floor muscle training.

2.4 Breast health

During pregnancy the breasts undergo a number of anatomical and physiological changes as they prepare for lactation. In the postpartum period, the breast considerations during return to rugby will differ for those who breastfeed and those who do not. In non-breastfeeding players, breast size will begin to reduce towards their pre-pregnancy state (involution of lactation), which may take 3-4 months(44). For breastfeeding players, breast size will undergo frequent fluctuation due to the production and removal of breast milk. Only once breastfeeding ceases, will involution of lactation begin.

Players should be supported in their ability and choice to breastfeed during the postpartum period. Current World Health Organisation recommendations are that infants are exclusively breastfed for 6 months and continue to be breastfed for up to two years of age or beyond with safe and adequate

complementary foods (45). If requested, players should be signposted to breastfeeding education to help them make an informed decision.

For breastfeeding players, appropriate provisions should be put in place for as long as required, such as a room to breastfeed and or express in, milk storage facilities and access to a lactation consultant (if required). Breastfeeding can be challenging for many women in the early stages and nipple pain and injury due to breastfeeding are highly prevalent (46), but usually resolve within 7-10 days (47). Few treatments have been found to be effective, with no treatment or applying expressed milk being similar to or better than applying ointment (47). Educating players around the likely duration of nipple pain is encouraged to facilitate continued breastfeeding if this is a player's wish.

2.5 Mental health

Mental health must be considered throughout the postpartum return to rugby period. Several postpartum related mental health disorders are prevalent such as postnatal depression (48), anxiety (49) and stress (49). Postnatal depression, in particular, can vary across the world depending on factors such as, income inequality, maternal and infant mortality rates, and the hours per week a women of childbearing age works (48). It is important that players and supervising staff are aware of, and screen for signs and symptoms of post-natal depression using the Edinburgh Postnatal Depression Scale (50). Efficient signposting to appropriate health professionals and services is paramount. Discussions and education around sleep quality and hygiene quantity should take place (eg minimising screen time, temperature) as poor sleep is a significant risk factor for mental health conditions.

Understanding the social support systems a player has is important when designing an individualised return to rugby program. Every player's situation will differ and National Governing bodies should fund tangible support (e.g., childcare, associated travel costs for a career).

2.6 Neurodivergent considerations

Changes to a player's routine (e.g., less exercise, unpredictability of day-to-day living) can be challenging for any player, but particularly for neurodivergent players. Additionally, sensory overload from birth can occur for certain neurodivergent conditions (51, 52). For these reasons, mental health must be viewed with an understanding of a player's neurodivergent condition. Preparation is key, putting in place appropriate support during pregnancy is advised. For example, letting healthcare providers know of a player's diagnosis and informing friends, and family what changes may be challenging. Neurodivergent resources can be found here and here.

2.7 Nutrition

Nutrition plays an essential role in injury and postpartum recovery. Therefore, specific calorie and hydration intake should be discussed early with the player and throughout the phased return to rugby, to optimize healing, support hypertrophic gains after the deconditioning period and to ensure that nutritional intake matches energy expenditure as exercise levels increase throughout the pathway (53, 54). This includes a balanced diet with nutrient dense foods and sufficient vitamin D. Breastfeeding women should be informed of the additional energy requirements required for them to avoid early low energy availability.

Table 4. Guidelines for Phase 1 (recovery) of return to rugby postpartum including pelvic floor, whole body strengthening, whole body conditioning, skills, breast health and milestones*

Phase 1: Recovery (0-2 weeks minimum)						
Pelvic floor	**Strengthening**	**Conditioning**	**Skills**	**Breast health**	**Mental health**	**Milestones**
Player education on pelvic floor, bladder and bowel hygiene PFMT in lying, sitting or standing Diaphragmatic breathing Establish link with pelvic health specialist	Low load abdominal exercises Mobility exercises	Walking and re-exposure to normal functional tasks	Nil	Breastfeeding support if required Education on nipple pain	Screening for postnatal depression Education on sleep hygiene	No infection No red flags No complications from delivery limiting progression Psychological readiness to progress No reliance on pain medication

*neurodivergent considerations should be applied for neurodivergent players, such as preparation during pregnancy. PFMT = pelvic floor muscle training.

3. Phase 2 (Review)

Phase 2 exposes players to a more familiar, yet regressed strength and conditioning programme (Tables 6 and 7). This is an important phase to assess whole systems (1) and screen for coexisting musculoskeletal pathologies, such as pelvic girdle pain or low back pain (2). Additionally, as injuries have been reported early in postpartum return to sport (16), players can begin to undertake injury prevention and position specific exercises from this phase onwards. Ongoing screening for pelvic floor dysfunction is vital and players should be reminded that symptoms should not be ignored or deemed "normal". Symptoms should be monitored not only during exercise, but within the subsequent 24–48-hour period to ensure the appropriate exercise prescription is given to elicit the intended physiological responses, as with any other injury rehabilitation programme.

In these early stages consideration should continue to be given to the practicalities of motherhood and training. Therefore, supervising clinicians should consider the timing, duration and venues of training and independent exercise prescription that is likely to be given to the player in the early weeks of this stage.

3.1 Pelvic floor

This pathway recommends that pelvic health physiotherapists or physical therapists oversee supervised pelvic floor muscle training for, and provide education on pelvic floor muscle training to, postpartum rugby players (27). An initial assessment should be undertaken at 4-6 weeks postpartum. This should include, where possible, the opportunity to access an optional internal pelvic floor muscle examination to directly assess the postpartum pelvic floor function and structural support. This will help guide medical teams as to whether the degree of impairment should limit progression through the pathway (19, 55).The examination should use the modified oxford manual muscle test to provide a detailed assessment of pelvic floor strength, endurance and co-ordination. In addition, a validated measure of structural support should be used (e.g., POP-Q, Bayden-Walker).

The pelvic floor muscles automatically anticipate and respond to the load applied to them, although this anticipated feedforward behaviour and response can be diminished as a result of pregnancy and childbirth (56). In rugby, the pelvic floor is required to tolerate multiple unanticipated, multi-directional loads, the transfer of force between the upper and lower body and intra-abdominal pressure from contact events and falls. Therefore, both pelvic floor muscular strength, endurance and speed are needed and encouraged as postpartum players work towards returning to rugby. This includes coordination of exercises in varied positions (e.g., lying, sitting, standing), including rugby specific positions (e.g. scrum position) and with recruitment and relaxation through range per repetition. Some players may find focusing on pelvic floor muscle recruitment during exhalation easier as the pelvic floor functions synergistically with the abdominal wall and diaphragm. Specifically, simultaneous concentric activation of the pelvic floor muscles occurs during the expiratory phase of respiration (57, 58).

Further to targeted PFMT , symptomatic players may find integrating rapid, strong, and purposeful, co-contractions with symptomatic rugby tasks useful to encourage automatic activity of the abdominal and pelvic floor muscles. This is known as the "knack technique" and has proven effective in athletic pelvic floor training regimes (32, 59), although no published research on pelvic floor training for rugby players currently exists. For example, strenuous resistance training or high exertional activities, such as bracing demands during contact events, may utilise synergistic contraction of the pelvic floor muscles and abdominal wall with an open glottis. The open glottis facilitates an exhalation strategy and is considered to prevent excessive intrathoracic pressure and therefore exhalation on exertion may be one useful strategy to facilitate intra-abdominal pressure

management during strenuous movements or tasks (60). However specific research investigating this mechanism is scant. Table 5 summarises these strategies.

Table 5. Example pelvic floor muscle progressions and recruitment strategies

Progressive functional pelvic floor strategies
1. *Education and identification of the pelvic floor*: Begin focused PFMT
2. *Strength and endurance progressions:* Increased repetitions and length of contraction in standing. For example, 1-2 rapid maximum voluntary contractions and 8-12 maximum voluntary contractions aiming to progress holds to 10 seconds
3. *Functional progressions:* Recruit the pelvic floor muscles during symptomatic tasks (note that this should not be something players have to think of in a game, it is a training exercise feed forward pelvic floor muscle activity when needed)
4. *Exhaling on effort ("blow as you go")* may be a useful strategy to continue to encourage reflexive pelvic floor activity
5. Ongoing directed intervention by pelvic health physiotherapist
6. Revert through strategies above if new symptoms present

3.2 Strengthening

Strength training is well documented as an essential component of evidence-informed return to sport following injury (61-63). Whilst, postpartum research is lacking, a similar approach is advocated in postpartum rehabilitation (3-5, 55, 64). Depending on pregnancy training levels there will be varying levels of muscle atrophy. Furthermore, tendon and ligament tensile strength and functionality have been shown to be affected within one month of detraining (65). We therefore advocate a progressive exposure to higher loads (weight) and speed of movement, commencing in less loaded positions initially, such as lying and seated, to support healing of the pelvic floor and abdominal wall (see Table 7 for example exercises). As healing progresses and symptoms permit, body weight exercises can then be reintroduced in standing, with a focus on form and endurance prescribing high repetitions. Frequency and intensity have not specifically been referenced throughout the pathway as clinical judgement should prevail. As with any rehabilitation and strength programme rest days are important, even more so in the postpartum period, and should be encouraged. Symptoms should be closely monitored after any change in exercise type before progressions are made.

It is important that all key muscle groups in the upper and lower limb are included muscle strengthening regimes, alongside a progressive pelvic floor and abdominal loading programme, due to players being exposed to a period of de-training. Further, strengthening of the gluteal muscles alongside pelvic floor muscle training may help those experiencing stress urinary incontinence (66). We also advocate for early integration of neck and shoulder injury prevention exercises (67), given players will have been absent from contact events for an extended period.

Double leg and body weight exercises are advised initially and will include graded exposure to more common lower body strength movements such as squats and Romanian dead lifts (61, 68). This should be progressed to include unilateral balance and strength training, which have been shown to be protective aspects within lower limb injury prevention programmes such as World Rugby's Activate Programme (69). Abdominal strengthening can progress through the phase, challenging the abdominal muscles with varied positions, loads and movements. Movements such as the curl up can increase rectus abdominis strength and thickness without compromising DRA healing (38). Indications that a postpartum player may not be tolerating the level of abdominal load applied include

adaptive strategies (e.g., excessive anterior pelvic tilt/lumbar extension/rib flare), pain, widespread muscle recruitment, excessive abdominal doming or sinking at the midline (5). As symptoms allow, light load can be progressively added to exercises.

Ongoing mobility exercises for the spine and all muscle groups should be encouraged and soft tissue therapy can support this if accessible. Pain should be assessed and monitored throughout but should not be considered a normal part of the postpartum rehabilitation process, specifically an increase in pain warrants assessment and should limit further progression of load and intensity.

3.3 Conditioning

Through this phase players should initially increase daily functional tasks, walking distance and intensity. As the phase progresses, comfort and symptoms will dictate non-impact conditioning progressions to a static bike, seated ski erg, cross trainer, swimming, or other modalities as deemed appropriate. Duration and volume should increase slowly and before intensity, with rest days promoted between conditioning session in the early weeks of this phase to monitor responses and promote physiological responses (65).

3.4 Skills

Early integration of coaches in the rehabilitation process is strongly advised. Players can begin video analysis work if available to them. Whilst some players may want to begin looking at video footage, others may find it an added stress in the early weeks. Therefore, progression should be at the player's discretion. As the phase progresses players can begin short range static based drills, starting in sitting and progressing to standing. During static based drills players should refrain from performing running and or high velocity movements. Players recovering from a caesarean section will likely return to this later in the phase or into Phase 3 depending on their individual healing and comfort.

3.5 Breast health

Depending on ability and choice to breastfeed, breast size may also fluctuate during the postpartum period and stay increased up to 24 weeks postpartum (70). High impact non-contact activities can expose players to considerable breast motion (e.g., running and jumping), inducing breast pain, which may affect playing performance (71). Greater breast motion is observed in larger breast sizes (72), meaning larger breasts may be more at risk of exercise-induced breast pain during non-contact rugby activities. Additionally, friction between breast tissue and a sports bra caused by breast motion can lead to frictional injuries, which are more prevalent in females with larger breasts and in contact sports (73, 74), and such friction may also exacerbate breastfeeding related nipple injuries. Therefore, whilst monitoring all players for breast pain and injury is important, support staff should be aware that breastfeeding players may be at an elevated risk of exercise-induced breast pain and frictional injuries.

Supporting clinicians should be mindful of their exercise prescription in players with painful breasts and modify programmes as required (e.g., limit or remove prone exercises). Returning to catching a ball may also be problematic for those beginning this phase earlier postpartum. Breast protection discussions or a focus on other rugby activities is advised. Similarly, players who have recently ceased breast feeding may have tender and engorged breasts and will need training modification as required. Cessation of breastfeeding can cause physiological and psychological effects for mothers and players should be supported through this transition.

Frictional injuries can be reduced by applying tape, ointment or anti-chafe cream to the skin. Additionally, such injuries can be reduced by wearing a: 1) correctly fitted sports bra that limits motion

between the bra and skin; 2) sports bra made from soft, smooth and moisture-wicking material to keep the skin dry (75) and; 3) sports bra with non-abrasive seams, hooks / fasteners / zippers (76).

Ensuring correct bra fit is an important consideration as players return to exercise towards the end of Phase 2 and in preparation for Phase 3, as a poor bra fit can result in greater breast motion, pain, discomfort, and friction. Sports bra assessment should consider the exercise intensity a player will be exposed to, to ensure the sports bra provides appropriate levels of support. Unfortunately, there are limited supportive breastfeeding sports bras currently on the market. Regardless of the ability and choice to breastfeed, it is important that players get appropriately fitted sports bras prior to Phase 3 as breast size is unlikely to have returned to pre-pregnancy size and exercise intensity will begin increasing (see World Rugby's breast health resource).

Providing or signposting players to bra fit education to enable players to fit their own bras is encouraged, as some women are reluctant to use bra fitting services (77, 78). Players should continue to be supported in their ability and choice to breastfeed. Whilst there is no evidence regarding the effect of playing rugby on milk composition or lactation, advising players to breastfeed or express prior to undertaking exercise is encouraged to avoid playing with engorged breasts. However, support staff should be aware that it may be difficult for players to time feeds around scheduled training activities.

3.6 Mental health

Phase 1 considerations should be applied in Phase 2. Additionally, access to a peer-group may enable players to share experiences with others who have returned postpartum or are going through their own return to rugby postpartum.

3.7 Neurodivergent considerations

As players grade back into physical exercise considerations must also be given to the cognitive load for neurodivergent players. Accommodating additional cognitive load required to plan and organise daily tasks for themselves and their baby, alongside social reintegration should be undertaken one-step at a time. Players and their support teams may wish to consider a 'buddy system', ensuring a player has someone who understands their neurodivergent needs and who will reach out to them when appropriate or exploring alternatives to face-to-face communication. Understanding what works best for a player is paramount.

3.8 Nutrition

As exercise and energy demands increase in Phase 2, players should continue with a nutritionally dense diet that matches energy expenditure. Supporting staff should appreciate potential concerns around body image for returning postpartum athletes (16), and both internal and external pressures for returning to pre pregnancy athletic status. In some cases, such pressures may result in low energy availability, intentionally or unintentionally due to altered energy intake and/or increased energy expenditure (79). The 2023 International Olympic Committee's (IOC) consensus statement identifies how 'problematic' low energy availability can have profound health and performance implications known as relative energy deficiency in sport (REDs). This is a syndrome of impaired physiological and/or psychological functioning with potential detrimental outcomes including, but not limited to, decreases in energy metabolism, reproductive function, musculoskeletal health, immunity, glycogen synthesis and cardiovascular and haematological health (79). REDs can compromise bone health and increase the risk of stress fractures, which are reported in postpartum athletes (16, 80). This may be further compounded by sudden increases in training intensity (81). Furthermore, REDs can increase the risk of pelvic floor dysfunction, fertility issues and impairments in performance (79).

Whilst beyond the scope of these guidelines to expand on REDs, it is paramount that both players and supporting clinicians are aware of the potential symptoms that athletes may present with, particularly in the elite pathway where there may be added pressures to return to sport quickly. Objective tools, such as the International Olympic Committee REDs Clinical Assessment Tool 2 (82), can assist clinicians in the assessment and management of athletes.

Postpartum women who breastfeed may not always be meeting nutritional needs (83), which is important to ensure milk supply is maintained whilst progressing through the stages. Players are encouraged to stay well hydrated and have a healthy, balanced diet that considers the energy requirements needed to maintain breastfeeding and perform increasing levels (volume, frequency and intensity) of exercise. For all postpartum players in the elite pathway, particularly those breastfeeding, a nutritionist should be consulted before Phase 3 as part of their multi-disciplinary team to tailor individual dietary strategies and maintain adequate energy availability.

Table 6. Example exercises for Phase 2 (review) of return to rugby postpartum

Focus	**Exercise examples**
Pelvic floor	1-2 rapid maximum voluntary contractions 8-12 maximum voluntary contractions aiming to hold for 10 seconds each. Repeat 2-3 times per day
Abdominals	*Early phase* Quadruped (add arm/leg lifts, supermans) Supine: arm lifts, single leg lifts, knee/arm dropouts, band pulls, ball squeezes Deadbug exercises starting with one foot down, Standing: band pulls, arm raises, *Mid to late phase* Quadruped*;* crouched exercises, supermans Deadbug progressions- add weight- progress to tabletop positions Curl up tasks Kneeling side plank Standing: pallof, progressive cross body exercises (light band/weight)
Strength	*Early phase* Lower body: Bridge, step ups, heel raises, side lying gluteal/adductor exercises, leg press/extensions, resisted hip flexions, gymball curls Upper body: Seated or lying upper body work (to include push and pull) and rotator cuff exercises, incline press ups Neck: Supine neck drills: deep neck flexor with isometric flexion, extension, lateral flexion and rotation *Mid to late phase* Lower body: Squat, lunges, Romanian dead lifts, split squats, standing adductor/hip flexor/gluteal exercises. Single leg calf and proprioceptive exercises. Upper body: Standing exercises to include push, pull and rotator cuff. Neck: Resisted banded drills and therapist led perturbations in all positions
Conditioning	Progressive walking Non-impact options (Bike, cross trainer, swimming, ski ergometer)

Table 7. Guidelines for Phase 2 (review) of return to rugby postpartum including pelvic floor, muscle strengthening, cardiovascular conditioning, skills, breast health and milestones*

Phase 2: Review (2-6 weeks minimum)						
Pelvic floor	**Strengthening**	**Conditioning**	**Skills**	**Breast Health**	**Mental health**	**Milestones**
Women's health review 4-6 weeks Daily PFMT (Table 6)	Progressive upper body, lower body, neck and abdominal loading Endurance focus Progress to more dynamic positions with light weight through the phase	Progressive walking distance and intensity Non-impact conditioning	Video analysis work Seated or static standing passing skills Short range kicking drills Walking passing drills towards end of phase	Monitor breast pain & frictional injuries Support a player's choice to breastfeed	Screening for postnatal depression Access to a peer support group and sport psychologist	No red flags No symptoms of PFD No significant musculoskeletal compensations during exercises Independently achieving pelvic floor muscle recruitment and relaxation Actively engaging in PFMT Bra fitting Screen for DRA and modify training according to individual need** No reliance on pain medication Psychological readiness to progress

PFMT = pelvic floor muscle training. PFD = pelvic floor dysfunction. DRA = diastasis rectus abdominis. *neurodivergent considerations should be applied for neurodivergent players. **the presence of DRA is not an automatic indicator to regress or modify training. Individual assessment of the ability of the abdominal wall to manage load is required.

4. Phase 3 (Recondition)

Phase 3 prepares and facilitates players to return to impact and running (Table 10), as well as more loaded traditional rugby strength and power development exercises (Table 9). It also encourages more position specific considerations and reintroduction of low-level skills in preparation for non-contact training in Phase 4.

Load management is crucial in this postpartum stage, as player demands increase. It is important that support staff consider a player's personal "life loads", alongside the exercise progressions. For a postpartum player "life loads" may include mental health, sleep quality and quantity, breastfeeding, social support and childcare. Exercise progression should be adaptable to each player and their situation, with changes to intensity, duration and frequency of exercise implemented as required. It is vital to have a monitoring system in place to assess various aspects of a player's health as they begin to recondition given the effects that reduced sleep can have on injury risk, performance, and strength gains (84, 85). We recommend using World Rugby's load management resources to support a postpartum player's return to rugby from Phase 3 onwards.

4.1 Pelvic floor

Pelvic floor training should continue, and exercise should be focused on training in functional positions (e.g., standing, forward lean/scrum position). If players are symptom free, this can be reduced from a daily effort to one to two times per week. Further pelvic floor assessment will allow for more individualised exercise prescription and may identify ongoing strength deficits or signs of pelvic floor dysfunction (86, 87). Submaximal endurance repetitions can be incorporated where athletes should be able to complete a 60 seconds submaximal 30-50% contraction (5).

Pelvic floor dysfunction may first present during Phase 3 as players begin to increase their exposure to impact. There is a high prevalence of rugby-related urinary leakage (88, 89) and postpartum players in particular having a higher risk (89). Players may only leak during specific rugby activities, with running and jumping being prevalent inciting events (89). Additionally, pelvic floor fatigue is associated with the development and or worsening of stress urinary incontinence symptoms (90). Therefore, monitoring of symptoms needs to include rugby specific activities. If players leak urine, they should be advised against frequent pre-exercise bladder emptying and or limiting fluid intake as management tools as this can develop into other bladder behaviour-related problems (19).

Some players may present with symptoms of pelvic floor dysfunction and continue to train alongside their pelvic floor rehabilitation (19, 55). Pelvic health physiotherapists will be able to guide the requirement for supporting adjuncts such as compression garments, urethral support devices and pessaries (19). If symptoms do not settle and continue to impair training ability and performance gains, an onward referral to a gynaecologist is recommended.

4.2 Strengthening

Towards the end of this phase a player can return to high-speed running. Therefore, adequate muscle strength is paramount in all muscle groups before high-speed running begins, specifically optimal hamstring conditioning to minimise injury risk as speed and volume increase (65). The load can be increased to strength-based exercises with decreasing repetitions and power-based exercises should also be introduced.

Progressive, dynamic and high load abdominal exercises in all planes of movement should be included to support power development and force attenuation in contact events. Given that postpartum women can have compromised trunk strength and endurance up to 26 weeks following childbirth (91), we advocate targeted, progressive, and integrated abdominal wall muscle

strengthening to overcome this deficit. Table 10 describes more common exercise progressions to support clinicians.

Players who have undergone caesarean delivery may require additional abdominal exercises and loading to progress to contact events, as a caesarean section can compromise trunk strength and endurance to a greater degree than vaginal delivery in the first 8 weeks postpartum (91). Such compromise may be due to physical disruption to the integrity of the anterior abdominal wall, as well as post-surgery pain. Additionally, at 6 weeks post-surgery, scar re-modelling is still taking place and may extend to further weeks (92) and abdominal fascia may only have regained up to 59% of its original tensile strength (93). Therefore, exercise progression within this phase should consider delivery mode.

Objective testing is advocated to make informed decisions about return to sport progression following injury (62) and a similar approach can be used returning to rugby postpartum. However, there is limited evidence regarding what should be tested. Given the potential de-conditioning of the whole body and the physical demands of rugby we recommend testing the neck, shoulder, and lower limb muscles. Muscle strength, power and function are predictors of functional capacity of an athlete and return to play testing should reflect such.

The type of tests used will depend on the player-specific baseline data and resources available (e.g., isokinetic dynamometry, hand-held dynamometry, maximum voluntary isometric test). It is recommended that players achieve 90% of their previous strength markers and 90% limb symmetry index (LSI) if available prior to integrating into non-contact training in Phase 4 (94-96). Endurance testing can occur without equipment, such as single leg calf raises, squats and leg bridges. Players should be able to perform between 20 and 30 repetitions, as a minimum, on each leg (97-100) although assessing more than the endurance capacity of muscles in clinical practice is recommended, and gym-based markers such as 1 and 3 repetition maximum could also be considered (96). Position specific exercises should also be integrated into this phase to prepare for training (Table 8).

Table 8. Example exercise based on rugby position and its associated demands

Position	Demands	Exercises
Hookers	Line out throwing requiring thoracic mobility, overhead strength and stability	Progressive throwing distance (begin short range) Shoulder press Medicine ball throws
Front row	Scrummaging	Neck strengthening Horizontal shoulder abduction/adduction exercises Progressive scrum exposure: scrum machine, 1v1, 3v3, 5v5, 8v8
Forwards	Increased short range collisions Line out lifting (shoulder mobility and strength) Line out jumping (shoulder mobility, abdominal strength, landing competencies)	Progressive contact intensity (e.g., 25-50-75-100%) Band/weighted bag lifts Progressive drop jumps including unstable surfaces Anti extension core drills
Backs	Higher running volume and tackling in open play	Progressive speed of footwork and agility drills Progressive contact exposure (e.g., walking, planned drills to reactive skills)
Kickers	Box, goal, field kicks requiring sufficient hip mobility, stance leg stability, hip strength, hamstring length and strength	Banded adduction Copenhagens Resisted hip flexor exercises with varying speeds Hip/hamstring mobility drills

4.3 Conditioning

Players must be able to perform rebound tasks, such as jumps and running, without displaying symptoms of pelvic floor dysfunction or experiencing musculoskeletal pain. Slow plyometrics can be introduced first before progressing to faster and more continuous plyometrics. Additionally, focusing on horizontal jumps and rebounds before vertical jumps will allow a graded exposure to load to be undertaken (see Table 10 for exercise examples) (101). From there, single leg exercises can be introduced (61). Plyometric progressions should occur without provoking a symptomatic response (e.g., musculoskeletal pain and or pelvic floor dysfunction), exercises may need to be regressed if provocation occurs. Objective data to quantify load attenuation on landing and force production during jump preparation can be collected using force plates if available. Alternatively, a visual assessment could be undertaken, but only movement patterns can be analysed rather than load

attenuation. Various tools exist to visually assess movement (e.g., Running Readiness Scale (102)). However, currently no postpartum return to sport movement screens have been developed. Therefore, whilst load or movement data can identify any asymmetries and potentially inform physical readiness to return to running or rugby-related movement demands, such information will not necessarily stop progression through the phases but rather inform exercise progression and selection.

On average, postpartum women return to running at approximately 12 weeks (6, 85). Running can commence sooner depending on symptom presentation, as a wide range of timelines to returning to running have been reported (e.g., < 6 weeks in elite runners (80)). However, running-related pain is common postpartum, and players should be continually monitored for any exercise-related pain during Phase 3 (Recondition) and beyond (6). Higher running-related pain may be related to gait changes (6), with postpartum women presenting more restricted trunk and pelvis motion (103). If players present with pelvic floor dysfunction and or musculoskeletal pain whilst running, a gait analysis by a biomechanist, and subsequent gait retraining, may be warranted to overcome the associated symptoms and pain (104-106). Clinicians and players should also consider that shoe size may change postpartum and therefore new footwear may be required.

Running progressions should gradually increase the ground reaction forces a player is exposed to. Before doing level running, players could perform incline running (107, 108), anti-gravity treadmill running (109) or water-based running. If symptom free, players should progress their running volume and intensity through gradual increases in distance covered and speed. It is recommended that only one variable, volume or intensity, be increased at a time. Players should then move on to rugby-specific running demands. These include high-speed running, deceleration, acceleration and change of direction. Running should initially be performed on non-consecutive days to minimise risk of secondary soft tissue and boney stress injuries and allow monitoring of symptom responses (65). Rugby evidence has demonstrated that those with poorly developed high-speed running ability and upper body strength had increased chances of contact injury (110) and therefore progression in this phase is vital, to support hamstring conditioning and mitigate injury risk.

Objective benchmark data for rugby related running demands can be obtained from global positioning systems (GPS). If GPS data is available, players should be able to perform their pre-pregnancy rugby running demands before they return to match play assessing total volume and high-speed running. If such data is not available, elite female rugby match data can be used: the average match distance covered is between 5000 m and 6000 m (111). Speed and aerobic testing may also be considered if there is baseline data available for the player (e.g., the bronco, 30:15 or speed gate tests). Players should target 90% of their pre-pregnancy running levels before returning to non-contact training. This may not be achievable for those returning at the earlier timescales of the pathway given the significant period of time the player has been absent from maximal effort running during pregnancy. However, 90% should remain a target throughout the returning months.

Towards the end of this phase players should be able to perform multi-directional tasks at speed and without symptoms (Table 9). Players can progress to more dynamic and running-based skills, individually and then in controlled skills environments to prepare for Phase 4.

4.4 Skills

Skills can be undertaken with progressive movement (e.g., from static, to walking, to jogging) and non-contact position-specific skills can be incorporated into a player's rehabilitation program. Example position-specific skills are shown in Table 8

4.5 Breast health

Phase 2 considerations should be applied in Phase 3. Players are advised to check the bra fit (including support level) each time they select their bra for training and if breastfeeding ceases

4.6 Mental health

Phase 2 considerations should be applied in Phase 3. As a player begins to gradually progress the volume and intensity of exercise, their psychological readiness to return to exercise should be considered. Injury-related literature has a number of psychological readiness questionnaires. We encourage asking players the following questions to assess their readiness to return to rugby, which are adapted from the Fear of Return to Sport Scale (112):

- Do you feel insecure about returning to rugby?
- Do you think you will be able to present the same rugby performance that you had before your pregnancy?
- Do you trust your body postpartum?
- Do you feel ready to return to rugby?
- Do you believe your abilities in rugby will be compromised by recovering from your pregnancy?
- Do you feel pressure to return to rugby?
- Are you afraid to perform some movements with your body?
- Do I feel psychologically prepared to return to rugby? (*neurodivergent consideration*)
- Is my nervous system in the right place to return to rugby? (*neurodivergent consideration*)

Some players may have been absent from the training environment for some time during phases 1-3 and may lack confidence on returning. A sport psychologist can be valuable for returning athletes if available to them.

4.7 Nutrition

With increasing exercise demands, it is vital that athletes continue to pay attention to sufficient intake to avoid problematic low energy availability. If a nutritionist is available, they should continue to support the athlete with their individual needs and supplementation as available and in compliance with anti-doping regulations. It is recommended that screening as outlined in the IOC REDs CAT2 (including blood, DEXA scans and other laboratory testing as indicated) occurs prior to phase 4.

Table 9. Guidelines for Phase 3 (recondition) of return to rugby postpartum including pelvic floor, whole body strengthening, whole body conditioning, skills, breast health and milestones*

Phase 3 (Recondition): Plyometrics & running (6-14 weeks)						
Pelvic floor	**Strengthening**	**Conditioning**	**Skills**	**Breast health**	**Mental health**	**Milestones**
Standing PFMT 1 – 2 times per week (Table 10) Repeat pelvic floor assessment 8-10 weeks	Add weight to exercises in all planes Position specific exercises	Continue non-impact conditioning Progressive plyometrics from horizontal to increasing vertical intensities Running progressions: • Incline/anti-gravity/stairs • Straight line • Increased speed • Change of direction, acceleration, and deceleration drills	Skills can be progressed from static- walking-jogging Begin position specific non-contact skills	Monitor breast pain, frictional injuries and sports bra fit Support a player's choice to breastfeed	Screening for postnatal depression Access to a peer support group and sport psychologist	Re-screen for DRA and modify training depending on individual need** Pain free during running Strength markers and limb symmetry index within 90% Achieved 90% of previous speed markers No symptoms of PFD Lower limb muscle endurance between 20 and 30 repetitions Psychological readiness to return to rugby

PFMT = pelvic floor muscle training. PFD = pelvic floor dysfunction. DRA = diastasis rectus abdominis. *neurodivergent considerations should be applied for neurodivergent players. **the presence of DRA is not an automatic indicator to regress or modify training. Individual assessment of the ability of the abdominal wall to manage load is required.

Table 10. Example exercises for Phase 3 (recondition) of return to rugby postpartum

Focus	Exercises
Pelvic floor	Standing: 8-12 reps of 10 seconds maximal voluntary contractions 60 seconds submaximal 30-50% contraction Repeated 1-2 times a week
Abdominals	Progress from kneeling to full plank variations including mountain climbers and jackknives Weight progressions to exercises eg curl up tasks, dead bugs, pallof, wood chops, trunk twists, medball slams
Strength	Lower body: Add progressive weight and speed to exercises. Exercises promoting triple extension including single leg strengthening and balance. Power based exercises such as cleans, trap bar jumps, prowler push Upper body: Add progressive weight and speed to exercises. Power based exercises such as explosive bench, medball throws, landmine throws, press ups Neck: Resisted banded/weighted drills in functional positions
Conditioning	*Early phase plyometrics:* Box jumps "on" Squat to heel raise (increase 'bounce') Lunge to lock out Horizontal plyometrics: incline jumping jacks Consider water based/band assisted plyometrics *Late phase plyometrics* Broad jumps Increasing height box jumps to include jumps "off" Single leg hops including multidirectional work *Running preparation* Consider water, antigravity and stair runs initially Running drills such as A, B skips, lock out drills. *Running progressions* Graded increase in running volume on non-consecutive days initially

5. Phases 4 and 5 (Return to training)

Phases 4 and 5 facilitate a return to team-based rugby integration progressing from non-contact rugby (Phase 4; Table 11) to contact rugby (Phase 5; Table 12). It is recommended that psychological readiness to return to rugby is assessed in each phase using the questions in Phase 3 (section 4.6).

5.1 Non-contact rugby

In terms of *pelvic floor, a* repeat pelvic floor assessment is encouraged after a period of non-contact training prior to contact exposure and individualised interventions implemented, as directed by the assessment (Table 11).

Progressive weight can be added to *strengthening* exercises, with individualised exercise prescription provided based on deficits identified in objective assessments.

In terms of *conditioning*, progressive involvement with the team and training volume is promoted as confidence and technical ability allow and once consistent running volume has been attained. Large changes in training load (volume or intensity) should be avoided due to the potential increase in injury risk associated with spikes in rugby training load (113), which may be exacerbated by a period of low training load during the latter stages of pregnancy and early postpartum. Players must be physically and psychologically ready to progress to contact-training before contact drills are initiated.

As symptoms dictate, players can begin to prepare for Phase 5 Contact training through their *skills* progressions. We recommend following World Rugby's 'Tackle Ready' and 'Contacts Confident' programmes when grading a player back into contact postpartum (Table 11). Progression through these programmes should be supervised by coaching staff .Example progressions include static tackle positions before adding planned and unplanned movement, small sided contact drills and then live play in phase 5. Additionally, they can undertake position-specific skills.

In terms of *breast health,* Phase 2 considerations should be applied in Phase 4. Additionally, sports bra fit and support may also need to be assessed to ensure it is sufficient for the exercise intensity being undertaken.

In terms of *mental health*, Phase 2 considerations should be applied in Phase 4.

In terms of *neurodivergent considerations*, Phase 2 considerations should be applied in Phase 4.

In terms of *nutrition*, training load will continue to increase through this phase so players should be reminded about the significance of matching energy intake to energy expenditure, even more so with breastfeeding athletes to avoid REDs. Menstruation does not always return immediately following childbirth for the majority of women, particularly those who continue to breastfeed, and clinicians should therefore ensure they are closely monitoring athletes for any other symptoms that may indicate inadequate fuelling or overtraining. For athletes whose periods have returned, symptoms and cycle length may be different to pre pregnancy. Further, 67% of female rugby players feel their menstrual cycle, and 10% their hormonal contraception, impairs performance (114, 115) and therefore, menstrual cycle tracking is advocated in postpartum players (see World Rugby's menstrual cycle resource).

5.2 Contact rugby

Players can commence a graded exposure to contact rugby events whilst in non-contact training (Table 12). Tackles (being tackled and tackling) are the most prevalent rugby-specific urinary incontinence inciting events. From a rugby perspective, forwards are at a greater risk of displaying urinary leakage whilst playing rugby than backs, whilst community level players are at a greater risk

than national level players (89). Additionally, being postpartum, having a high body mass index and high training volume increases the odds of leaking urine whilst playing rugby (88, 89). It is important for players and their support teams to be aware that as players resume contact training it may provoke pelvic floor dysfunction symptoms that were not present previously. The onset of pelvic floor dysfunction symptoms indicates referral to a pelvic health physiotherapist for review.

In terms of *strengthening and conditioning*, neck strength has been identified as a possible modifiable risk factor for rugby-related head injuries in male players, specifically a higher neck strength was associated with lower concussion rates (116). Female players have low neck strength (117) and this may be a factor in the high concussion rates in female rugby (118). Therefore, ensuring appropriate levels of neck strength are present as players commence contact rugby is advised. If pre-pregnancy baseline data is available this should be used as a target level. Furthermore, the shoulders play a pivotal role in executing a proficient, injury free tackle technique (119). It is therefore important to ensure that appropriate shoulder strength is present in postpartum players before contact events are instigated. It is advised that players are within 90% of all baseline data strength assessments (e.g., neck, shoulder, lower limb) and undertaking the full team strength programme and full team conditioning training by the end of Phase 5. Individualised strength exercise prescription based on deficits identified through assessments are encouraged.

In terms of *skills,* players are exposed to high loads during rugby contact events and such events are the most common injury mechanisms in rugby, particularly for head injuries (118). Not only do players need to withstand high loads, how they perform contact events needs to be considered. Specifically, a player's technique during the tackle event can affect injury risk; with poor tackle proficiency increasing the risk of injury (120). Furthermore, fatigue can affect neuromuscular control and has been shown to effect tackle proficiency (121). Therefore, it is crucial players are prepared for tackle events to mitigate injury risk.

We recommend continuing to follow World Rugby's 'Tackle Ready' programme (Table 12). Under coach supervision, progression should include exposing the player to different positional demands with increasing levels of fatigue. Individual player skill needs (e.g., tackle technique) can be undertaken in preparation for Phase 6 Return to Play. Players' tackle competencies should be assessed and progression to return to rugby should occur once players are deemed to have a proficient tackle technique.

In terms of *breast health,* Phase 2 considerations should be applied in Phase 5. In addition, the potential for breast contact-related injuries warrants attention. Breast injuries may negatively impact performance and are a common occurrence in rugby (73, 74). Nearly 70% of female rugby players have experienced contact-related breast injuries, with contact from another player being the most common mechanism, followed by contact with the ball and then the ground (73, 74). Players who sustain contact injuries have a higher body mass index and larger breasts than those who do not (73), which may be an important consideration for players returning to rugby postpartum. Specifically, players who breastfeed may have increased body mass index and breast size for up to 12 and 24 weeks respectively postpartum (70). Therefore, breastfeeding players may have a greater risk of contact breast injuries than those who do not and they should be informed of this risk.

The effect of high compressive and shear forces being transferred to the breast region during rugby contact activities whilst breastfeeding is currently unknown. However, caution is advised due to the potential to incur structural damage, such as trauma to milk ducts from high compressive forces (122). If structural damage is sustained and breasts become tender and swollen, breastfeeding *may* be advised to cease to limit the pooling of milk within the breast (122). In such circumstances guidance should be accessed from appropriate medical and lactation specialists, with appropriate assessment and treatment strategies recommended to manage breast injuries (76). Further, given

breast injuries go unreported in rugby and to advance our understanding, medical teams are recommended to use female athlete health domains in their injury surveillance to improve recording, reporting and management of breast health problems in rugby and the postpartum population (123).

Breast protective equipment can be worn, as long as such equipment complies with the Laws of the Game. However, there are currently no World Rugby approved breast protection pieces of equipment (124). The majority of players who wear protective equipment in contact sports perceive it to provide protection against breast injuries (124), but no empirical data exists showing such equipment reduces breast injury risk, particularly for breastfeeding players. Therefore, no recommendations can be made regarding breast protective equipment.

In terms of *mental health*, Phase 2 considerations should be applied in Phase 5.

In terms of *neurodivergent considerations*, Phase 2 considerations should be applied in Phase 5.

In terms of *nutrition*, Phase 4 considerations should be applied in Phase 5.

Table 11. Guidelines for Phase 4 (return to non-contact training) of return to rugby postpartum including pelvic floor, strengthening, conditioning, skills, breast health and milestones*

Phase 4 (Return to training): Non-contact training (12 weeks minimum)						
Pelvic floor	**Strengthening**	**Conditioning**	**Skills**	**Breast health**	**Mental health**	**Milestones**
Repeat pelvic floor assessment prior to non-contact exposure Individualised interventions directed by the assessment	Continue to add weight to exercises Individualised exercise prescription as assessments identifies	Non-contact training (Progressive volume)	Progressive tackle, contact and position specific skills	Monitor breast pain, frictional injuries and sports bra fit	Screening for postnatal depression Access to a peer support group and sport psychologist	Player physical and psychological readiness to progress Strength and endurance markers, within 90% of baseline Symptom free

*neurodivergent considerations should be applied for neurodivergent players

Table 12. Guidelines for Phase 5 (return to contact training) of return to rugby postpartum including pelvic floor, strengthening, conditioning, skills, breast health and milestones*

Phase 5 (Return to training): Contact training (14 weeks minimum)						
Pelvic floor	**Strengthening**	**Conditioning**	**Skills**	**Breast health**	**Mental health**	**Milestones**
Repeat pelvic floor assessment if symptomatic of PFD Individualised interventions directed by the assessment	Full team programme Individualised exercise prescription as assessments identifies	Full team training	Individual player needs	Monitor breast pain, frictional injuries, contact injuries and sports bra fit Breastfeeding and potential injury risks discussions Breast protective equipment discussions	Screening for postnatal depression Access to a peer support group Return to play support	Player physical and psychological readiness to progress All strength and endurance markers within 90%+ of baseline Symptom free Coach approved tackle competencies

PFD = pelvic floor dysfunction. *neurodivergent considerations should be applied for neurodivergent players

6. Phase 6 (Return to play)

Once a player has successfully progressed through Phases 1 to 5, they are able to return to match play (Phase 6; Table 13). A graded increase in minutes played is advocated to allow confidence and aptitude to develop. The postpartum period does not end once a player has returned to play, with some defining postpartum as up to two years following childbirth (123). We recommend that players and clinicians continue to review and monitor pelvic floor dysfunction symptoms, as well as musculoskeletal pain and mental health for two years (if resources allow), but one year as a minimum.

Players returning to play postpartum should be evaluated like any other player returning from injury or a prolonged absence from rugby (Table 13), this includes being symptom free. Additionally, baseline assessments for concussion and any other health problems should be re-tested. The Strategic Assessment of Risk and Risk Tolerance framework can be a useful tool to support teams in determining a player's readiness, which can be complex and challenging, particularly in the elite pathway (125).

6.1 Pelvic floor

Adjustments to training practices, exercises or match availability may need to be made based on pelvic floor dysfunction symptoms presented, with further pelvic health assessments undertaken as required (126). Whilst being symptom free is promoted, we acknowledge that there may be scenarios where some symptoms are continuing to be treated and or managed and deemed safe to play (89).

6.2 Strengthening

Players can perform the normal weights programme as part of their team’s training plan, in addition to any individualised training programme as directed by strength-based objective assessments and needs.

6.3 Conditioning

Players can perform the normal conditioning programme as part of their team’s training plan.

6.4 Skills

It is recommended that players complete a minimum of three full weeks of unrestricted training with their team prior to playing a match. Normal training should include exposure to full contact and high-intensity non-contact activities.

6.5 Breast health

Phase 5 considerations should be applied in Phase 6. A sports bra fit and support should be reassessed if breastfeeding ceases.

6.6 Mental health

Phase 2 considerations should be applied in Phase 6.

A player may progress through the phases from a physiological perspective, but their psychological readiness to return to play is paramount and forms an important aspect of clinical decision making on whether an athlete is ready to merely participate or perform (2, 127). These guidelines advocate that return to play is player centred, holistic and involves all key members of the team, particularly as coaches may lose contact with long term injured players which can impact on anxiety around return to play (128).

Returning to rugby postpartum may illicit similar psychological considerations to those observed when returning from injury. In particular, a fear of movement has been reported in postpartum runners to reduce the odds of returning to sport (6). Athletic identity may also be compromised during the perinatal period due to the physical changes associated with pregnancy and postpartum, and decline in athletic capabilities that may present (17, 129, 130). Players then transition to new mother-athlete identities, which can be difficult to navigate (131, 132). Other psychological factors, such as self-efficacy, have been shown to be important for return to sport following lower limb injury (133) and may interact with how a player moves as they progress through rehabilitation phases (134). Therefore, we recommend including a sports psychologist as part of the multidisciplinary team to enable a player to be psychologically ready to return to rugby.

6.7 Neurodivergent considerations

Phase 2 considerations should be applied in Phase 6.

6.8 Nutrition

Players should continue to ensure an adequate energy intake to minimise the risk of REDs and adequate macro and micro-nutrients to ensure optimal health and injury prevention. Individual modification and requirements will continue to be directed by the nutritionist and doctor if required. Players will most likely have returned to their pre pregnancy diet and should ensure that any additional supplementations are in accordance with anti-doping policies.

Table 13. Guidelines for Phase 6 (return to play) of return to rugby postpartum including pelvic floor, strengthening, conditioning, skills, breast health and milestones*

Phase 6: Return to play (16** – 20 weeks minimum)						
Pelvic floor	**Strengthening**	**Conditioning**	**Skills**	**Breast health**	**Mental health**	**Milestones**
As directed by symptoms and pelvic health assessment carried out	Normal weights programme	Normal conditioning programme	Three weeks full contact training prior to returning to play	Monitor breast pain, frictional injuries, contact injuries and sports bra fit Re-assess sports bra fit once breastfeeding ceases	Screening for postnatal depression Access to a peer support group Sport psychologist support for return to play	Multi-disciplinary team deem player has both skill and conditioning ability to return to play safely All baseline data at 90-100% Baseline assessments for concussion and any other health problems should be re-tested Symptom free Player reported physical and psychological readiness to return to play

**neurodivergent considerations should be applied for neurodivergent players. **indicates the minimum time since giving birth that it is recommended a player return to play (matches).

7. **Key recommendations**

To support the guidelines and milestones, key recommendations are provided with the associated evidence level and rationale for the recommendation (Tables 14 – 22). Evidence level is based on the classifications reported by the Royal College of Obstetricians and Gynaecologists (135).

Table 14. Should rugby players undertake pelvic floor muscle training?

Recommendation	Evidence level	Rationale for Recommendation
It is recommended that all postpartum players, regardless of delivery and symptoms, complete pelvic floor muscle training as part of their rehabilitation throughout the pathway.	Level 1-	Level 1- for proactive approach in pregnancy (136, 137). Level 1- for proactive approach in postpartum (138). Level 1- evidence for reactive approach in athletes: Systematic review of pelvic floor muscle training in female athletes found it to be effective at reducing symptoms of urinary incontinence (23).

Table 15. Should rugby players have supervised pelvic floor training?

Recommendation	Evidence level	Rationale for Recommendation
It is recommended that postpartum rugby players have access to a pelvic health assessment and supervised pelvic floor training during their rehabilitation to prevent and manage symptoms of pelvic floor dysfunction (e.g., pelvic organ prolapse, urinary incontinence).	4	Expert opinion. Level 2+ evidence for supervised pelvic floor muscle training or unsupervised training with regular assessments and education on correct pelvic floor muscle contractions are more effective for treating urinary incontinence in women than unsupervised pelvic floor muscle training without education (27).

Table 16. Should players be screened for diastasis rectus abdominis?

Recommendation	Evidence level	Rationale for Recommendation
It is recommended that postpartum rugby players are screened for diastasis rectus abdominis during Phases 2 and 3.	4	Expert opinion. No studies exist on postpartum athletes, but screening before Phase 2 may identify natural pregnancy-related changes, which have not returned back to normal.

Table 17. Should players breastfeed, if they are able and choose to?

Recommendation	Evidence level	Rationale for Recommendation
It is recommended that postpartum rugby players be supported in their choice to breastfeed, including tangible support (e.g., breastfeeding room, lactation consultant, pump equipment and storage of expressed milk). It is recommended that potential injury risks are discussed prior to exposure to rugby-related contact events.	4	Expert opinion. No studies exist regarding breastfeeding and rugby. The World Health Organisation recommends exclusive breastfeeding for the first 6 months and for up to two years with safe and adequate complementary foods, players should be supported in their ability and choice to follow these recommendations.

Table 18. What muscle groups should be targeted during postpartum rehabilitation?

Recommendation	Evidence level	Rationale for Recommendation
It is recommended that postpartum rugby players complete a progressive and integrated full body strength and abdominal loading programme over a minimum of a four-month period to effectively recover from pregnancy and delivery, to prepare for rugby demands.	4	Expert opinion. There are systematic reviews (evidence level: 2++ and above) of specific injuries (e.g., DRA, ACLr) using a range of populations (e.g., general population postpartum, recreational athlete non-postpartum), but a lack of research on rugby postpartum populations (e.g., 38, 139).

DRA = diastasis rectus abdominis. ACLr = anterior cruciate ligament reconstruction.

Table 19. When can rugby players return to running postpartum?

Recommendation	Evidence level	Rationale for Recommendation
Postpartum rugby players may return to running prior to 12 weeks but is not advised if symptoms of pelvic floor dysfunction are identified prior to, during or after running attempts.	3	Retrospective cohort studies have reported a range of times taken to first run (80, 140). The average (median and mean) reported in large scale cohort studies is 12 weeks (6, 85).

Table 20. Should time be used to guide rehabilitation progression?

Recommendation	Evidence level	Rationale for Recommendation
It is recommended that objective testing, rather than time, be used for elite postpartum players' rehabilitation progression, similar to long-term sports injuries. However, tissue healing time requirements must be respected. The extent of this objective testing will be determined by resource and supporting clinicians' judgement/preference.	4	Expert opinion. No studies exist identifying objective criteria for postpartum rehabilitation progression, but objective testing will allow for an individualised approach to rehabilitation. Tissue healing of the pelvic floor and abdominal wall in caesarean sections should guide progression, particularly in the early stages.

Table 21. Should a sports bra fit be undertaken as players progress from Phase 3 onwards?

Recommendation	Evidence level	Rationale for Recommendation
It is recommended that all players have access to bra fitting services from Phase 3 onwards and be monitored for breast pain and injury. For breastfeeding players, it is recommended that a second bra fitting occurs once breastfeeding ceases.	4	Expert opinion. No studies exist in postpartum athletes, but due to changes in breast size during pregnancy and postpartum (particularly when breastfeeding) all postpartum players should be fitted with an appropriate sports bra.

Table 22. When should rugby players return to play postpartum?

Recommendation	Evidence level	Rationale for Recommendation
It is recommended that postpartum rugby players do not return to play prior to four months (16 weeks) as a minimum and complete at least 3 weeks of full training prior to returning to play.	4	Expert opinion. No studies exist in postpartum rugby players. Whilst, objective testing should inform the readiness to return, along with a player's psychological readiness, a time is provided due to the high impact, contact nature of rugby to ensure adequate strengthening, conditioning and skill competency can be met prior to returning to play.

8. Monitoring implementation

All rugby clubs that undertake injury and illness surveillance should record a player's postpartum return as part of this monitoring (123). This will provide information relating to the length of time taken to return to training and any associated postpartum health problems. Injury and illness surveillance systems should have annual reporting in place, where the time taken to return can be determined.

9. Summary

A six-phased evidence-informed, return to rugby postpartum guideline has been presented that uses a whole-systems, biopsychosocial approach. The progressions and examples provided are not meant to be prescriptive but provide a template that should be tailored to individual needs. A checklist has been created for clinicians to use as they support players to return to rugby postpartum (Appendix B) as well as a medical assessment form (Appendix C). Rugby clubs should view the postpartum period as an opportunity to optimise a player's technical and physical abilities, whilst considering their mental health. Support staff should be cognizant of the fact that motherhood can be a daunting time that is constantly changing. Therefore, a player's phased return to rugby needs to be adaptable, placing the mother and child at its centre, which includes applying neurodivergent considerations throughout the six-phased return-to-rugby for neurodivergent players.

It is important that rugby governing bodies support postpartum rugby players in tangible ways, allowing players to focus on getting fit to return to rugby. For example, governing bodies should financially support players on maternity leave, cover associated health costs (e.g., access to a pelvic health physiotherapist and other multi-disciplinary team members), provide breast pumps, fridges and breast pump rooms and cover associated travel costs for childcare.

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World Rugby.

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Araba Chintoh: Chair of Women's Player Welfare World Rugby Advisory Group.

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14. **Appendices**

Appendix A:

14.1 Overview of guideline and recommendation development process

The core group formulated the guidelines (Phases, milestones) and Key Recommendations based on the narrative review and experience within the team (e.g., playing, clinical and academic). These guidelines and the Key Recommendations focus primarily on considerations important from a rugby perspective rather than wider, general population postpartum considerations. For example, high loads being transferred to the abdominal wall (e.g., screening for DRA) and rugby-related urinary leakage (e.g., pelvic floor muscle training) rather than covering all prevalent postpartum musculoskeletal problems. The wider group externally reviewed the draft guidelines and recommendations, which involved voting on the Phases, milestones and Key Recommendations. The purpose of this group was to provide additional content expertise, improve the quality of the work, rate the appropriateness of the Phases, milestones and Key Recommendations and the usability and generalisability of the guidelines.

A survey was sent to all wider group members alongside the draft guidelines. The survey composed of four sections: 1) Voting on recommendations for each phase of the return to rugby postpartum guidelines; 2) Voting on usability and generalisability of the guidelines; 3) Voting on Key Recommendations in the return to rugby postpartum guidelines and 4) free text boxes to expand on voting choices made in sections 1-3. Voting on the first section was performed on a 5-point Likert scale (1: extremely inappropriate, 2: somewhat inappropriate, 3: neither appropriate nor inappropriate, 4: somewhat appropriate, 5: extremely appropriate). Voting on the second and third sections were performed on 5-point Likert scale (1: strongly disagree, 2: disagree, 3: neither agree nor disagree, 4: agree, 5: strongly agree). Agreement was determined as members choosing 4 or above on each 5-point Likert scale. A threshold of 70% agreement was used to decide if revisions were *required* and further voting necessary. Additionally, written feedback on the document and or in free text boxes (section 4 of the survey) were used to inform if any revisions *could* be made to strengthen the quality of the work, particularly where 100% agreement was not observed in the voting outcomes. The core group members reviewed all feedback and voting outcomes and considered these when compiling the final guidelines and recommendations.

14.2 Voting outcomes and influence on guidelines and recommendations

All key recommendations reached agreement above the 70% threshold, with all except one reaching 100% agreement within the wider group members (Table 23). Based on clinical experience within the core and wider group team, and views of players no changes were made to the skills section. Written feedback from several wider group members identified the need for '*Mental health'* to be added as an additional consideration for each phase and it was subsequently included in each phase (in text and guideline tables). Further, '*Nutrition'* was also highlighted by one member as an important consideration and was included in each phase (in text only).

Table 23. Proportion (%) of wider group members who agreed (4 or above on the 5 point Likert scale) with the recommendations for each phase of the return to rugby postpartum guidelines

Phase	Pelvic floor	Strengthening	Conditioning	Skills	Breast health	Milestones
Phase 1	100%	100%	100%	100%	100%	100%
Phase 2	100%	100%	100%	88%	100%	100%
Phase 3	100%	100%	100%	100%	100%	100%
Phase 4	100%	100%	100%	100%	100%	100%
Phase 5	100%	100%	100%	100%	100%	100%
Phase 6	100%	100%	100%	100%	100%	100%

All items relating to the usability and generalisability reached agreement above the 70% threshold, with two reaching 100% agreement within the wider group members (Table 24). Revisions were made within the document based on written feedback to: 1) broaden the definition of 'elite' by removing the need for 2-3 in-person supervised sessions; 2) ensure consistency between text and tables and; 3) ensure consistency across phases of the return to rugby pathway.

Table 24. Proportion (%) of wider group members who either agreed or strongly agreed with the usability and generalisability statements for the return to rugby guidelines

Item	Proportion
The guidelines for each phase are user-friendly for clinicians and or support staff	100%
The checklist (Appendix B) is user-friendly for clinicians and or support staff	100%
The whole document is user friendly for clinicians and or support staff	88%
The guidelines are appropriate for a global audience, which will vary in resource, personnel and access	88%

All key recommendations reach agreement above the 70% threshold, with all except one reaching 100% agreement within the wider group members (Table 25). Following the feedback received, the recommendation related to 'Supported in choice to breastfeed (Table 17)' was expanded to include: 1) a dietician as an example tangible support and 2) 'consideration of energy requirements'.

Table 25. Proportion (%) of wider group members who either agreed or strongly agreed with the Key Recommendations in the return to rugby guidelines

Key recommendation	Proportion
Pelvic floor muscle training for players (Table 14)	100%
Access to a pelvic health assessment and supervised pelvic floor training (Table 15)	100%
Players should be screened for diastasis rectus abdominis during phase 2 (Table 16)	100%
Supported in choice to breastfeed (Table 17)	88%
Full body strength and abdominal progressive loading programme over a minimum of four months (Table 18)	100%
Return to running prior to 12 weeks depending on pelvic floor dysfunction symptoms presentation (Table 19)	100%
Objective testing to guide progression, whilst healing times are also respected (Table 20)	100%
Access to a bra fitting service from Phase 3 onwards, monitoring breast pain and injury (Table 21)	100%
Postpartum players completing a minimum of 3 weeks of full contact training prior to returning to rugby. Return to rugby being a minimum of 16 weeks of postpartum (Table 22)	100%

Appendix B:

14.3 Checklist for postpartum return to rugby

Phase 1 key summary criteria	Completed
1. Initial recovery strategies have been explained and encouraged to promote healing (e.g., nutrition, relative rest, sleep strategies)	☐
2. Pelvic floor muscle training has commenced daily	☐
3. The player has been educated on bladder and bowel hygiene, recovery strategies and pelvic floor	☐
4. Links have been established with the supporting pelvic health physiotherapist	☐
5. The player has been screened for psychological and physical red flags	☐
6. No infection or complications from delivery limiting progression to Phase 2 are present	☐
7. No reliance on pain medication	☐
Phase 2 key summary criteria	**Completed**
8. Pelvic floor muscle training continues and the player can independently recruit and relax their pelvic floor muscles	☐
9. Player offered a pelvic health assessment	☐
10. Strength training has begun for all muscle groups, focusing on endurance and form before increased load, with no significant musculoskeletal compensations during exercises	☐
11. Non-impact conditioning has commenced as comfort and symptoms allow	☐
12. Passing drills have commenced and the player can comfortably complete walking passing drills	☐
13. Player offered a sports bra fitting	☐
14. The player has been screened for diastasis rectus abdominis	☐
15. No red flags are present or symptoms of pelvic floor dysfunction	☐
16. No reliance on pain medication	☐

Phase 3 key summary criteria	Completed
17. Pelvic floor muscle training continued, but reduced to 1-2 times per week in asymptomatic players	☐
18. Strength training has integrated higher loads and position specific exercises	☐
19. Progressive plyometrics and running has commenced in asymptomatic players (running should be pain free)	☐
20. Position specific non-contact skill progressions have been introduced	☐
21. No symptoms of pelvic floor dysfunction during strength progressions, plyometrics or running	☐
22. The player has been re-screened for diastasis rectus abdominis	☐
23. Lower limb strength within 90% of baseline data prior to engaging in non-contact training and endurance between 20-30 repetitions	☐
24. Player has achieved 90% of previous speed markers	☐
25. The player leads return to non-contact readiness, and reports mental and physical readiness to return	☐
Phase 4 key summary criteria	**Completed**
26. If symptomatic, player offered repeat pelvic floor assessment prior to contact exposure	☐
27. Player integrated into non-contact training with a graded increase in volume and intensity. Position specific skills continue to be addressed, with coaches identifying specific skill deficits or focus areas	☐
28. Tackle progressions have begun using World Rugby's 'Tackle ready' and 'Contact confident' programmes	☐
29. Re-assess sports bra fit and ensure support is sufficient for exercise intensity	☐
30. The player leads return to contact readiness, and reports mental and physical readiness to return	☐
Phase 5 key summary criteria	**Completed**
31. Player offered repeat pelvic floor assessment if symptomatic prior to returning to play	☐
32. Objective testing completed for all major muscle groups, strength 90%+ of baseline data (if available)	☐
33. The player has proficient tackle technique based on coach-assessed tackle competencies	☐

34. For breastfeeding players: Breastfeeding and injury risks, and breast protective options discussed	☐
35. No symptoms of pelvic floor dysfunction during non-contact and contact activities	☐
Phase 6 key summary criteria	**Completed**
36. Player has completed a minimum of 3 weeks full contact training prior to returning to play	☐
37. Coaches and performance teams deem player competent to return to play and have completed all objective testing to satisfactory levels (using baseline data if available)	☐
38. Baseline assessments for concussion and any other health problems have been re-tested	☐
39. The player leads return to play readiness, and reports mental and physical readiness to return	☐

Appendix C:

14.4 World Rugby subjective postpartum assessment

Name:..... Date:……

Lead supporting clinician (name / role):.....

Pre-Pregnancy Medical History

Medical history	
Medications	
Mental health history (if applicable)	
Smoker?	
Alcohol intake	

Pregnancy

Gravida	
Miscarriages	
Medical complications (e.g., gestational diabetes / pre-eclampsia / hypertension)	
Musculoskeletal issues	
Foetal complications	
Pregnancy exercise level	
Pregnancy duration (weeks)	

Delivery

Mode: (Vaginal/instrumented / episiotomy / caesarean-planned / caesarean-emergency)	
Complications:(tears / infection / blood pressure/ haemorrhage)	

Baby

Name		Birth date	
Birth weight		Feeding mode	
Sex			
Any current concerns			
Childcare support			

Postpartum

Ongoing bleeding / lochia	
Current medical history	
Current medications	
Contraception?	
Periods returned?	
Musculoskeletal concerns/symptoms	
Current weight + nutritional concerns	
Psychological symptoms/concerns (include Edinburgh depression scale)	
Sleep (total hours/number of disturbances)	
Other player concerns	
Social support structure	

Initial Screen for pelvic floor dysfunction: *(See Australian Pelvic Floor Questionnaire for more detailed assessment throughout pathway)*

Urinary / anal incontinence	
Pelvic organ prolapse symptoms (bulging) / heaviness / Dragging sensation	
Voiding dysfunction / obstructive defaecation	
Has normal sexual activity resumed?	

Summary

Current weeks postpartum	
Main concerns (if any)	
Onward referrals required? (if any)	
Starting phase in return to play process	

Objective assessment will depend on the experience of the leading clinician and should be ongoing throughout the return to play process as directed by the guidelines