

BUILT TO PLAY, NOT TO BREAK

How and Why Do Female Footballers
Experience Greater Injury Risks?



Executive Summary

This research led project investigates how and why female soccer player are more prone to injury risks in comparison to male players, with a particular focus on anterior cruciate ligament (ACL) injuries. The investigation explores how the physical, psychological and environmental factors have contributed to these risks, while also analysing how prevention and recovery strategies can better support female players.

Through the use of survey's, semi structured semi structured interviews and documentary observations with female players, physiotherapists, strength and conditioning trainer and coaching staff, the research identified key factors on the rate of injury occurrences. The findings revealed that the heightened training loads and game demands, physical and psychological stress, inadequate recovery, footwear design and playing surfaces have contributed to the increased vulnerability to injuries.

The report concludes that female players encounter unique challenges and experience that often overlooked in traditional training and product designs. To address this, a greater holistic approach has been recommended, by working with strength and conditioning programs that appropriately tailored for female's physiology, advancing footwear selection and greater integration of mental and emotional health support. Not only can these considerations reduce player injury risks but also enhance player performance, wellbeing and attitude.

Authenticity Statement

This is to certify that to the best of mt knowledge, the content of this presentation is my own work. This presentation has not been submitted for any subject or for other purposes. I certify that intellectual content of this presentation and designs is the product of my own work and that all the assistance received in preparing this report and sources have been acknowledged.

AI Use Statement

I have utilised Otter AI, to assist in transcription interview notes and ChatGPT to refine survey and interview questions.

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THE TOPIC

INTRODUCTION

BACKGROUND

BENCHMARKING



1.0 Introduction

Injuries are unfortunately an unavoidable component in competitive sports, uncovering the wider concerns regarding training loads, physiology and the design of playing environment and equipment. In football, female players consistently encounter more injury risks than men, especially with anterior cruciate ligaments (ACL) tears. As women football continues to grow, addressing these risks is crucial for players well-being and the future of the game.

This project investigates how and why female footballer's encounter much greater injury risks than males. While research identifies various factors like the difference of biomechanics, hormonal influences and access to tailored strength and conditioning programs, a gap still remains in comprehending the full interconnections of these factors. Exploring these factors is crucial to reducing injury prevalence and creating a safer and more inclusive sporting environment for female players.

The report is structured into five sections:



1.1 Background

Football (soccer) is the world's most supported sport, with an estimated 3.5 billion supporters (Singh, 2025). As women's football continues to expand, the disproportionately high anterior cruciate ligament (ACL) injuries have an increase in female players. During the 2022-2023 professional season, there were 57 ACL injuries across the six female professional leagues, refer to Figure 1. The long rehabilitation process has long-term consequences for player's well-being, mental health, performance and career. Current literature determines that women in professional football are 2-6 times more likely to suffer an ACL injury in comparison to males (Ireland, 2002). The alarming frequency of which these injuries occur has prompted academic investigations into the underlying risk factors to female players.



Figure 1 2022-2023 ACL Injuries
Sourced from SoccerDonna

1.1.1 Female Anatomy

1.1.1.1 Female Knee Structure

The anatomic differences between the two sexes are a significant factor into the increased ACL injury risk in female players. As seen in Figure 2, women's wider hips can alter the knee alignment, increasing the probability of developing dynamic knee valgus, a condition that has been linked to ACL risks (Oberoi, 2024; Russel et al., 2024).

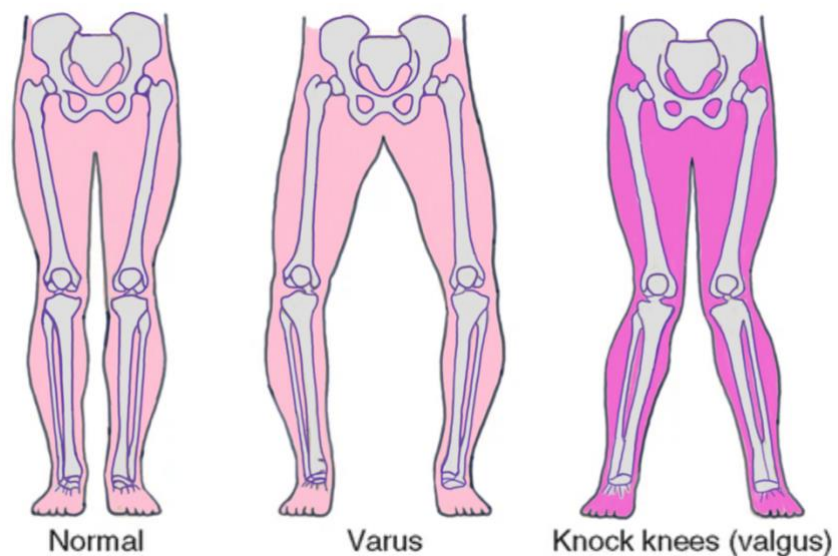


Figure 2 Difference In Lower Extremity Structure

The tibial anatomy, femoral notch morphology and ACL size are also major contributors (Cheung et al., 2015). Most noticeably, women display an increase posterior tibial slope (PTS), which directly affects internal rotation of the knee joint in weight bearing conditions, increasing a player's likelihood for player to strain their ACL (Hashemi et al., 2008, 2011; Lipps et al., 2011). A narrower femoral notch can increase injury risk by causing impingement of the ACL, increasing strain of the ligament (LaPrade & Burnett, 1994; Cheung et al., 2015). Female ACLs are generally smaller, allowing for a higher likelihood rupture in comparison to males (John et al., 2025).

1.1.1.2 Musculoskeletal and Core Influence

Fatigue and disrupted movement patterns can evoke compensatory musculoskeletal mechanisms that reduce performance and increase injury risk (Cheung et al., 2003; Weist et al., 2004). 70% of ACL injuries are caused by non-contact mechanisms, which indicates that musculoskeletal factors, such as muscle strength/endurance or joint stability, greatly influence injury risk (Ireland et al., 2018). Core stability is also vital, as without sufficient core strength, even strong lower extremity muscles may result in inefficient movements due to the lack of force generated in the core, leading to inadequate energy transfer (Richardson et al., 1990; De Blaiser et al., 2019). Generally, males display greater core stability, and found athletes that have lower core stability measure were more likely to experience injuries (Leetun et al., 2004).

1.1.1.3 Lower Extremity Alignment

Lower extremity alignment contributes directly to the forces and strain on the knee compartments, ligaments, and musculotendinous structures. Females tend to have lower centre of gravity, wider pelvis, shorter legs, and greater genu valgus than males (Hunter et al., 1982; Griffin, 1984). Additionally, “females often have increased femoral anteversion, less development of the vastus medialis obliquus (VMO), increased flexibility and differences in notch shape and width compared to males” (Hutchinson & Ireland, 1995). An increase Q-angle “can cause excessing lateral force onto a female players quadriceps”, encourage the overuse and fatigue of these muscles on the player (Hutchinson & Ireland, 1995).

1.1.1.4 Hormones and Menstrual Cycle

Research has determined that the “sex hormones significantly influence ACL rupture rates in women” (John et al., 2025). The hormonal influence can reduce the ACL strength, due to the “heightened estrogen levels that contribute to the increased joint laxity around the knee, further weakening joint stability” (Wild et al., 2012). Additionally, females experience “an assortment of physiological and psychological changes that can influence athletic performance and overall well-being” (Smith, 2024).

Wojtys et al. (1998), discovered that more ACL injuries occur during the ovulatory phases of the menstrual cycle. However, in 2024 researchers determined that “injury risk was significantly elevated during the luteal phase of the menstrual cycle” (Barlow et al., 2024). Further research needs to occur to “better understand the influence of the menstrual cycle on injury risk and to develop interventions to mitigate the risks” (Barlow et al., 2024).

1.1.1.5 Running Biomechanics: Male vs Female

The “sex-specific differences in morphology of the pelvis and thigh can lead to variation in biomechanical characteristics” (Xie et al., 2022). Ferber et al., (2003), found that the bony structure of the sex-specific morphology that may contribute to the differences in running related injuries, due to female runners having larger hip-width to femoral length ratio in comparison of male runners. Females have a 62-76% running-related injuries, in comparison to male runners who only have a 24.32% incident rate (Taunton et al., 2002). Women also “present greater frontal and transverse planes of motion in the lower extremities...specifically exhibition greater hip internal rotation and adduction...and peak knee abduction” (Malinzak et al., 2001). On the contrary male runners display greater running economy utilising less oxygen at a given speed (Daniels & Daniels, 1992),

1.2 Benchmarking

1.2.1 The Current Market

Football boots play a crucial role in load transmission, foot protection and performance, with their structured design affecting possible injury risk as well as touch, weight and durability (Bentley et al., 2011; Kulesa et al., 2017; Hennig, 2011). The boot market is dominated by brands like Adidas, Nike and Puma, whose acceptance and use often relies on brand reputation and aesthetic as seen in Figure 3. These companies market their products “with an emphasis on highlighting a single performance characteristic like speed, touch/control or kicking power” (Okholm Kryger et al., 2021). However, the majority of boot designs are based on male biomechanics, creating a significant market gap in providing a women specific football boot (Okholm Kryger et al., 2022).

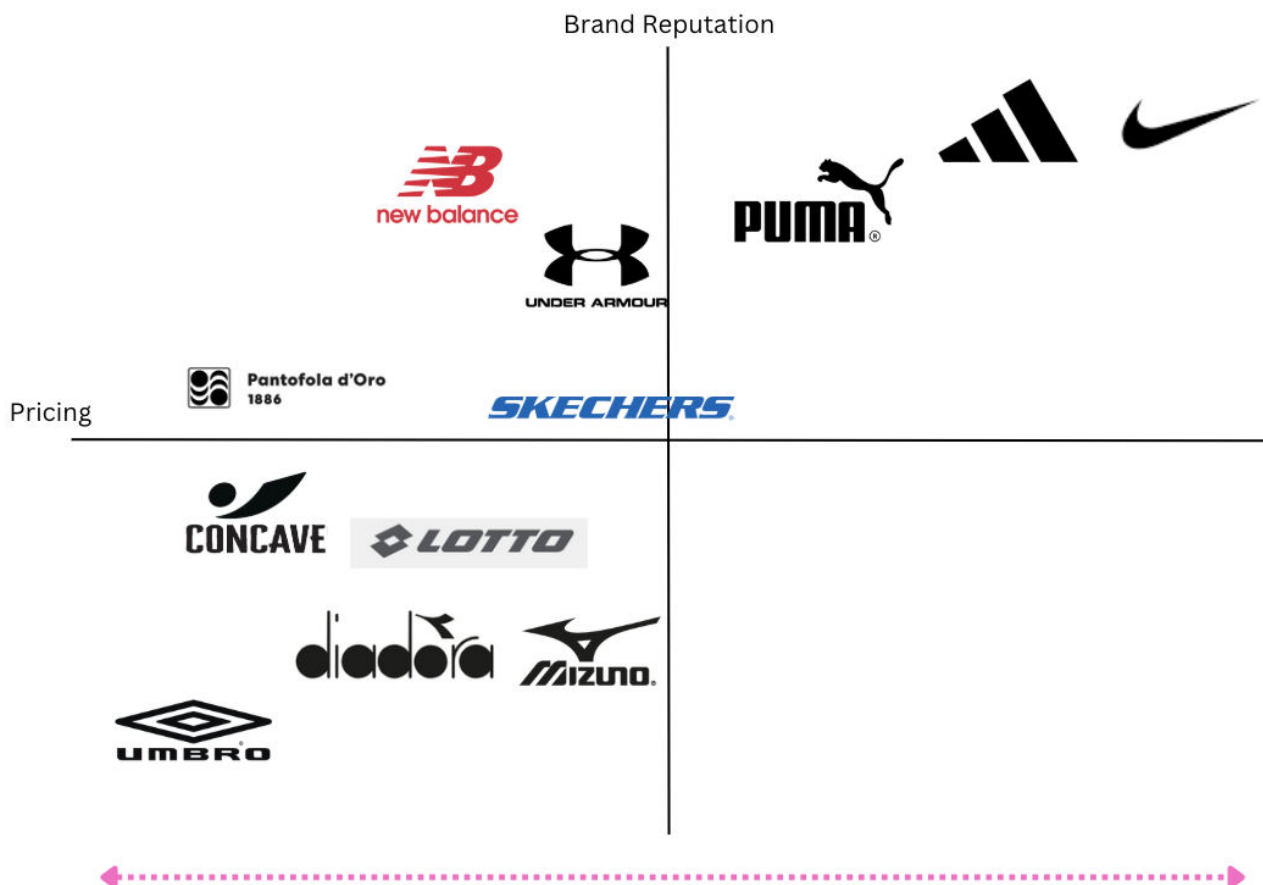


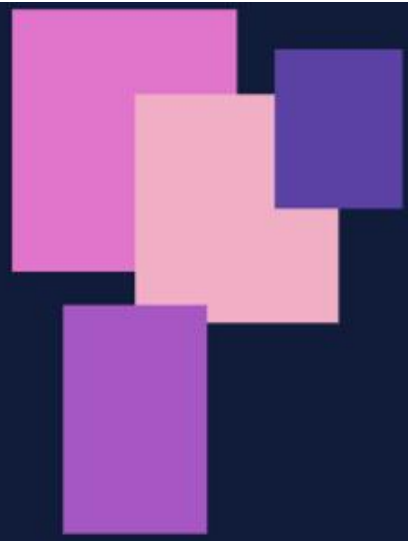
Figure 3 Current Football Boot Market

1.2.2 Gap in the Market

As of September 2025, there are only seven female specific football boots on the market (Figure 4), reflecting the growing participation and recognition for female football. However, the limited volume of women specific boots can significantly impact female player's feet, ranging from foot deformation, skin conditions (e.g blisters) and overuse injuries (e.g metatarsal stress fractures) (Okholm Kryger et al., 2022). As such these companies have produced products with modified spud pattern, arch support and decreased weight to better support the female's biomechanics (see Figure 4). Companies like Puma and Under Armour market their products through innovation and sustainable materials, with modifications to the outsole design and layout. Whilst Adidas and Puma emphasise heightened player performance and female biomechanics. Such redesigns have been well accepted and adopted in the playing community, as seen in the public reviews (Figure 4) , with Puma and Nike becoming the two leading competitors in this area.

Brands	Image Of Boots	Boots Name	Feature 1	Feature 2	Feature 3	Public Reviews
		PUMA Women's King	K-BETTER™ upper material, made with recycled content to reduce environmental impact	Lightweight outsole features an external heel counter, integrated stability spine, and conical studs	made for the our players, with measurements such as volume and instep height engineered for the female foot.	★★★★★
		PUMA Women's Future 7	FUZIONFIT: Knitted upper that provides customisable lacing while maintaining a sock-like feel	Dynamic Motion System: this super lightweight outsole is designed to provide freedom of movement and enhanced multidirectional traction thanks to its advanced stud configuration	The upper of this shoe is made with at least 20% recycled materials	★★★★★
		PUMA Women's Ultra 5	SPEEDSYSTEM : The outsole design combines a high-performance fibre base material with a revolutionary stud system, maximising energy return for faster acceleration	FastTrax studs for optimal traction, and a lightweight mesh upper.	GripControl skin ensures decisive command over the ball.	★★★★★
		Under Armour Women's Shadow	Water-resistant Never-Wet coating on upper to keep you cool & dry	Molded sockliner provides underfoot comfort	Carbon fiber agility outsole for maximum acceleration & deceleration to help create separation on firm ground natural surfaces	★★★★★
		UA Magnetico Elite 3 FG	THE PERFECT FIT UA Clone upper adapts and flexes to your foot's shape and movements for a flawless fit.	ULTIMATE CONTROL Unique, 3D texture grips the ball every time you receive it for better ball handling.	BETTER TRACTION Studs shaped to relieve pressure and give support so you can hit full speed.	★★★★★
		F50 Sparkfusion	Fusionsole for extra arch support.	Sprintrame Fusion outsole supports women's biomechanics for increased agility on multiple surfaces.	Fibertouch upper with Sprintweb 3D texture	★★★★★
		Nike Phantom Luna 1 Elite	Traction the Phantom Luna features a new circular stud pattern that allows for better rotational traction on the pitch	Fit Featuring a new upper design, Nike Asym Fit, the boot features a snug fit around the ankle, which female players asked for throughout the research phase.	Feel Nike Gripknit, to the Phantom Luna upper for optimal boot-to-ball connection. The coating gives a sticky feeling and is integrated into the material, so the boot stays soft and pliable.	★★★★★

Figure 4 Women Specific Boots



RESEARCH

COLLECTION OF
RESEARCH

FINDINGS ANALYSIS



2.1 Collection of Research

To collect the primary research, a triangulation method was utilised. The triangulation process can enrich research by offering a variety of datasets to help explain differing views of a particular phenomenon (Noble & Heale, 2019). As seen in Figure 5 there are four categories of triangulation as posed by Denzin (1970); (1) Data Triangulation, (2) Investigator Triangulation, (3) Theory Triangulation and (4) Methodological Triangulation. For the purpose of this investigation, the Methodological Triangulation method, “which promotes the use of several data collection methods such as interviews and observations”, to gain great extraction of information to critically examine the findings. As shown in Figure 6, the Triangulation was attained by utilising Semi-structured interviews, Surveys and Video Observations.



Figure 5 Four Categories Of Triangulation



Figure 6 Obtaining Qualitative & Quantitative Data

2.1.1 Semi Structure Interviews

The semi-structured interviews were completed with a strength and conditional specialist, physiotherapist and a recent ACL female player, who are all experienced working in and with the footballing context. This method was critical in collecting and exploring “open-ended data, to explore participant thoughts, feelings and beliefs” regarding how and why female players have a greater injury risk (DeJonckheere & Vaughn, 2019).

As seen in Figure 7, each interview was conducted via a mix of in-person and virtual interviews, with questions that were focused on the participants experience and professions. All participants were contacted prior and were provided with project synopsis and consent forms via email to fill out before each interview (Appendix A). After interviews were transcript, texts were coded into topic

<i>Participant Type</i>	<i>Participant Number</i>	<i>Interview Type</i>	<i>Mode</i>	<i>Duration</i>	<i>Record Method</i>
Strength and Conditioning Coach	1	Semi Structured	In Person	1 Hour	Otter Ai Transcript, Word Documentation
Physiotherapist for Female Football Team	2	Semi Structured	Zoom Meeting	30 Minutes	Otter Ai Transcript, Word Documentation, Zoom Video
Injured ACL Female Football Player	3	Semi Structured	Zoom Meeting	45 Minutes	Otter Ai Transcript, Word Documentation, Zoom Video

Figure 7 Interview Summary

themes for further analysis and connections between interviews (Appendix B).

2.1.2 Video Observations

The observation video was a five-part, documentary style series, produced on Arsenal's public YouTube channel called 'STEP BY STEP' (Arsenal, 2023). The documentary focuses on a player duo, who suffered ACL injuries and how their absence and rehabilitation experiences impacted them as players/individuals. The episodes consisted of the player injury experience, lead up to the injury, initial impact of the injury, rehabilitation process and eventual return to game play. Note taking process was utilised to observe player and specialist insights, as well as prevention research and strategies (Appendix E)

2.1.3 Surveys

It was essential to understand a greater scope of the current state of female football, how players had been injured and what impact that left on them. Additionally, investigated how coaching staff adapt to injured players and how they support these players. Both surveys were 20 questions and included a range of multiple choice and optional short answer responses.

These surveys were created on Google Forms, with an all-accessible link shared via Instagram Stories, Facebook Groups and iMessage's, (Appendix F).

2.2 Analysis Findings

2.2.1 Interview Analysis

The thematic analysis of the three interviews revealed critical and influential patterns and themes. In creating a table of themes and codes to analyse the transcripts of interviews, code quotes were gathered into clusters, to depict the interconnection between codes and themes (see Appendix C & D). This analysis revealed four core themes that were critical to interview discussion and greater understanding of the issues in this space.

2.2.1.1 Theme One: Greater Injury Risk

Greater injury risk for female players was a consistent theme through each interview. All the participants mentioned the biomechanical difference that females have, most noticeably the larger Q angle, and the impact of the menstrual cycle (see Figure 8 and 9). Which strongly aligns with recent research literature

...biologically is our muscles and our tendons and our ligaments develop more laxity, which means they are looser, well, not looser. They are like a weaker rubber band, so it doesn't have the tensile strength that the rubber band would normally have. Because of the different hormone levels, the level of estrogen and testosterone we're having causes a further laxity, which means we have joint laxity so that we end up having a higher risk.
Participant 1

Figure 9 Insight Into Understanding The Greater Risk Of Injury

regarding this topic.

One participant added that there is too much overload on players with the “biggest issue being how much load people are taking on during the season, and the fluctuations in load between on and off season as well” (see Figure 10). Another participant shared further insight, seen in Figure 11, the timetable depicts how the congested game scheduling influences this overload on players. To counter this, two of the participants, highlighted the importance of working with the individual players to create strength and conditioning workouts to train the body for overload.

...our biggest issue is just how much load people are taking on during the season, and the fluctuations in load between on and off season as well.
Participant 2

Figure 10 Participant 2 Overload Insight

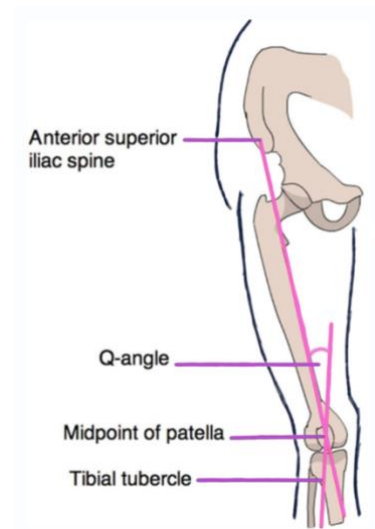


Figure 8 Female Q-Angle

JULY/AUGUST:

MON	TUE	WED	THU	FRI	SAT	SUN
TRAINING Physio Check-In	TRAINING Physio Check-In		TRAINING		GAME DAY	
MON	TUE	WED	THU	FRI	SAT	SUN
TRAINING Physio Check-In	GAME DAY		TRAINING Physio Check-In	GAME DAY		GAME DAY
MON	TUE	WED	THU	FRI	SAT	SUN
TRAINING Physio Check-In	TRAINING Physio Check-In		TRAINING Physio Check-In		GAME DAY	
MON	TUE	WED	THU	FRI	SAT	SUN
TRAINING Physio Check-In	TRAINING Physio Check-In		TRAINING Physio Check-In			GAME DAY

Figure 11 Example Of Game Schedule Overload

However, it was emphasised that it comes down to the individual players to adopt these programs (see Figure 12). Interestingly, Figure 13 shares that the psychological influence, on players who come back to game play become “too protective”, which causes a hesitation of not going into challenges strongly causing risk of re-injury.

Ultimately, there is great support with recent literature that the biomechanical and hormonal difference significantly impacts initial injury risk, whilst also highlighting that the combination of players psychological confidence and lack of strength and condition significantly increases a player’s opportunity of getting re-injured again.

There will be some people who would rather just kind of, not rather, but who choose to carry a niggly injury for longer and just go, it'll, it'll get better eventually.
Participant 2

Figure 12 Participant 2 Player Attitude Insight

And then for me, most of my injuries, I get really psychological about them and get too protective of them, which means I go into tackles worse than I already am, and that's when I get it again. So there's a high potential that come 2027, I'll go to play and I'll just freak out and be too protective of my knee.
Participant 3

Figure 13 Player Psychological Influence

2.2.1.2 Theme Two: Experience of Injury

The experience of injury was another crucial theme in understanding the greater impact injuries can have on the players. One of the participants was currently suffering an ACL injury and wanted to share their experience. As seen in Figure 14, this participant has experienced a wide range of lower extremity injuries, none that have compared to how their ACL journey has been. Initially the participant shared their initial thoughts to their ACL injury, feeling the pop but not being in immense pain, believing they had only dislocated their knee (see Figure 15). Later elaborating that they didn't feel much due to the ACL being completely separated (see Figure 16).

The rehabilitation process has been a “very slow, very painful experience”, with the after pain and scaring being the most challenging aspect of the experience (see Figure 17). This was further elaborated by another participant, explaining the process of reconstructing the ACL and how this is often traumatic (see Figure 18). All three participants stated that the importance of support for players throughout this traumatic journey (see Appendix B).

The experience of injury varies from player to player, with pain levels, support outlet and the injury, impacting how the player approaches the rehabilitation process.

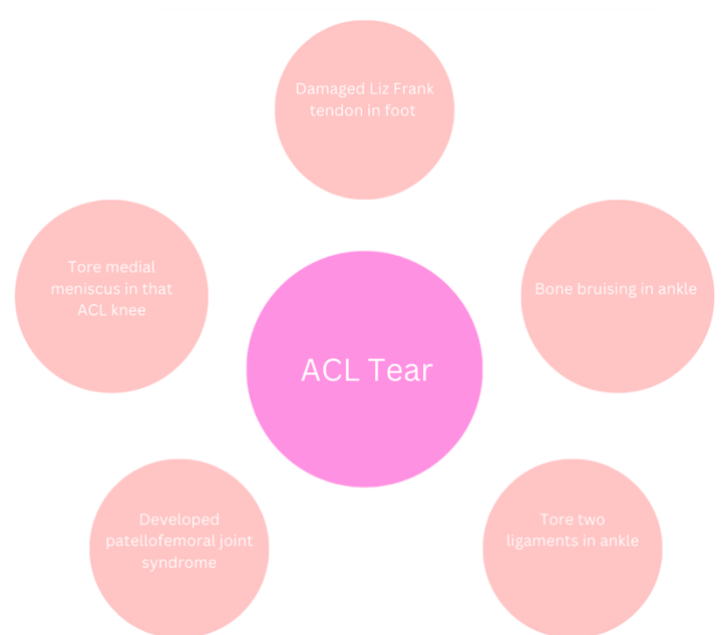


Figure 14 Player Injury History

I thought it was just dislocated, because I was kind of in denial...I was like, this wasn't even that bad. I just felt her to pop. And then that was it. Like, it wasn't an immense pain. I wasn't in, like, no pain at all. Like it, I just didn't really have much feeling of it at all.
Participant 3

Figure 15 Recounting ACL Injury

There's no nothing together, like it completely separated. So there was no feeling, because I had no ACL, essentially.
Participant 3

Figure 16 Player ACL Pain

It's one of those ones that brings along a comorbidity of other injuries that is recurrent ACL on the same side of the other side, hamstring tears, quad tears, sort of gastrocnemius problems, so like your calf problems and ankle problems, because you're pretty much like, relearning how to do everything. It's a pretty gnarly injury. Often they are quite traumatic.
Participant 1

Figure 18 Specialist Insight On Player Rehabilitation Process

It's very slow, very painful... the scars have not been healing great. I had a few issues with that, and it's just it's sore, like it's just consistently sore.
Participant 3

Figure 17 Player Rehabilitation Process

2.2.1.3 Theme Three: Mental Health

All three participants highlighted the mental strain that a serious injury like ACLs can have on the players. Often players feeling a sense of fear, anxiety, frustration and sadness throughout the experience (see Appendix B). Interestingly one participant compared the experience to grieving the loss of their knee and independence, implying how their life was never truly going to be the same (see Figure 19). Additionally, the fear of the unknown, was a common mental block in players, impacting how these injured players prepped for surgery and early-stage recovery (see Figure 20).

Interestingly, injured player participant, shared in their efforts to continue to support the team by coming to watch games, they often felt like they had drifted from teammates and often went home crying after supporting games (see Figure 21). They also added that although teammates checked in regularly, this became repetitive and often the participant lied about their state, which could be linked to what participant 2 uncovered, that players do not like to let their team down (see Figure 22).

Similarly, to previous experience, the impact of mental health in serious injury context will vary from player to player, which ultimately impacts how a player experience rehabilitation and eventual return to play.

Sadness, loneliness, kind of feeling and almost like grieving my knee

Participant 3

Just that grieving the whole what my life was like, because for me, like, sport was my main coping strategy for, like, stress and everything. And now I don't have it

Participant 3

...girls that I worked with, they're all like, yeah, like, I'm really nervous to get back out there. There is a psychological block to going out there, because they know what it felt like to be in that excruciating pain.

Participant 1

Figure 19 Impact of Feelings & Lifestyle

The fear going into it (surgery) being like, I'm going to wake up and I'm either going to be able to walk or I'm going to not be able to walk at all. And I wasn't sure how bad the pain was going to be.

Participant 3

...fear of the unknown, like, what's it? What am I going to come out of this surgery? Like, and how is my rehab going to go? Am I going to when am I going to be able to run again? When am I going to be able to do this again?

Participant 3

Figure 20 The Fear Of The Unknown

I hated going and watching, because it was like that I could be on the field...I used to go home and cry after every game because I didn't want to, like, it made me sad that I couldn't be on the field...And it almost felt like, like they were getting tighter, and then I was just kind of here.

Participant 3

Figure 21 Player Attitude Toward Injury

A lot of the time, people just don't, don't like to let the team down. They feel like they're letting the team down, or the coaching staff down, or whoever it might be.

Participant 2

Figure 22 Specialists Insight Into Why Player Lie

2.2.1.4 Theme Four: The Importance of Education

The importance of properly educating players was a common theme across all three participants. From a specialist standpoint, one participant stated its crucial to talking to the players and help them understand rehabilitation and training exercises by showing why, the exercises are beneficial for the players (see Figure 23). The other specialist participant showcased the successful use of educating players to better the rehabilitation and training process by asking their players why they are doing certain exercise and encouraging that educational learning and knowledge through conversation (see Figure 24). However, the player participant outlined their lack of education in a footballing context, stating there needs to be more insight and awareness of injury risks and injury preventions before engaging in sports (see Figure 25).

if someone understands the background, I guess, and has a just a very basic understanding of some of the research that's out there, and what it shows, then there's, it gives the exercises and things we're doing a lot of meaning to them.

Participant 2

Figure 23 The Importance of Educational Communication Between Specialists & Players

I think what we do really well is we educate our players on what appropriate recovery looks like...

I always make my learning sessions quite educational, and that probably comes from my background here is like, why are we doing D cells? Why are we doing acceleration so they actually understand the translation to field.

Participant 1

Figure 24 Professional Example Of Educating Players

I think that there, there should be a lot more insight into, like, this is what you should be aware of if you come into play sport, and how do we manage that better?

Participant 3

Figure 25 Player Perspective Of Greater Education & Knowledge

2.2.2 Observation Analysis

The 'STEP BY STEP' documentary, shows viewers the ACL journey of Beth Mead and Viviana Miedema, partners and players in the Arsenal Women's squad. Episode One; 'Football Was My Happy Place', sets the tone with the Arsenal Head of Performance Services, utilising a knee model to explain how the ACL are commonly ruptured or torn. The documentary transitions into one of the most striking sequences of what led up to the two players ACL injuries.

Beth's injury occurred late in the game, with Arsenal 3:2 down, she pushes herself to chase a loose ball, the opposition nudges her off-balance causing a change in direction on Beth's knee (Appendix E). Two months later Viviana tore her ACL in a non-contact movement when she planted her foot and turn at the wrong time. (Appendix E). As seen in Figure 26, the conditions and decisions made were critical in how these players got injured. Both players reflected on their initial pain and shock whilst providing personal insights into these moments, seen in Figure 27. It was later revealed in Episode 1 and expanded in Episode 4, that the lead up to these games played a crucial influence on the players mental and physical well-beings, with a family members health concerns affecting both the players psychological preparedness for the games.

Across Episode Two to Five, the documentary follows the highs and lows of the rehabilitation process, from relearning how to run, to progressing into light training. Both players shared the mental setbacks and frustrations, alongside the physical stress. Episode Three also stands out, by featuring the collaboration of the pair with a research team investigating why ACL injuries are disproportionately frequent in female players. These conversations placed the documentary as not only a personal journey but also as a contributor for greater awareness and change.



Figure 26 Lead Up To Injuries

Key Findings:

- Both Incidences shared various similarities in how the ACL popped
- Rehabilitation is a long, mentally straining process.
- The physical and mental fatigue that the overload of game scheduling has on players.
- Arsenal Football club are changing in how they prepare and train female player to prevent this issue as much as possible.
- Documentary sparked a much-needed conversation and investigation about prevention and player well-being.

"I planted and got nudged in a different direction running at quite a high speed...And the pain that follows that was not very nice". B.M

"Once I planted my foot, I obviously heard a massive pop". V.M

"I remember the pain setting maybe 30 seconds to a minute after and thinking, I might be OK here...I think deep down I didn't want to think it was this injury". B.M

"I had a lot of pain...never felt anything like it" V.M

Figure 27 Player Reflect & Share Injury Pain Experience

2.2.3 Survey Analysis

The surveys were created to reveal the football public concern, experience and understanding of footballing injuries.

2.2.3.1 Footballers Survey

A total of 25 respondents participated in questions regarding player's motivation to play, injury experience, injury support and overall thoughts in female football.

The key findings include:

In preparation, 54% of players train twice a week with additional gym conditioning throughout the week (Figure 27).

56% of players got injured from contact challenges by opposition with ankle injuries being the most common injury with 16 responses, as seen in Figure 28. During their times of injury, players felt a mix of emotions as seen in Figure 29, most players felt more frustration, closely followed by sadness and anxiety. Fortunately, majority of players felt like they receive various lines of support, seen in Figure 30, majority of players relied on Family and Teammates support. Closely followed by the support of friends, coaching staff and physios. However, two responses outlined that nothing helped during this time.

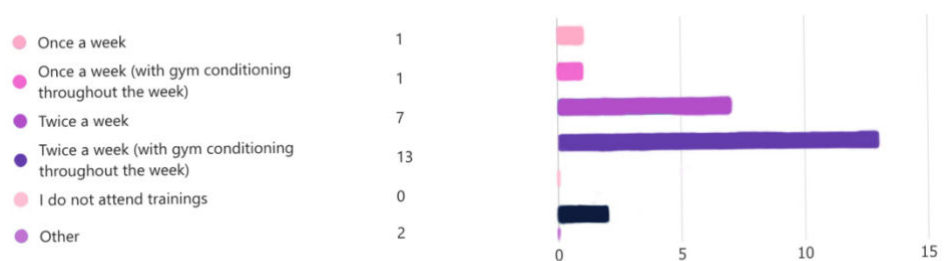


Figure 27 Players Training Routine



Figure 28 Cause Of Injury

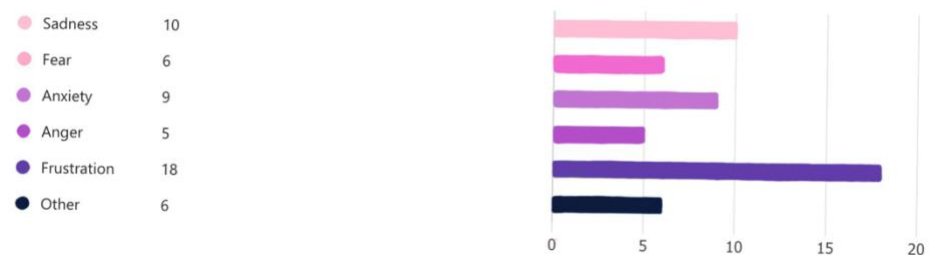


Figure 29 Players Feelings When Injured

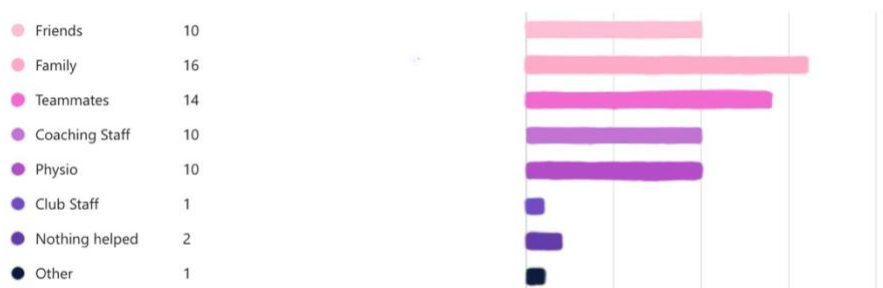


Figure 30 Player Injury Support Systems

Alarming, 96% of female players felt that female sport is not treated equally to males (Figure 31). This was more significant when 79% declared that they have not received gender-specific rehabilitation (Figure 32).

Yes	1
No	23

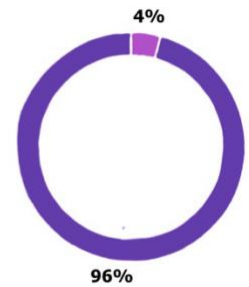


Figure 31 Players Thoughts Of Equality Towards Female Football

Interestingly, 65% of players viewed the playing surface conditions to be impactful in the occurrence of injuries, with 46% of players feeling a little nervous to play and 33% fully nervous and scared to play on playing surfaces, refer to Figure 33 and 34.

Yes	0
No	19
Unsure	5

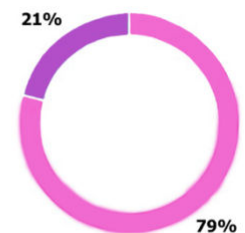


Figure 32 Player Experience Of Receiving Gender Specific Rehabilitation

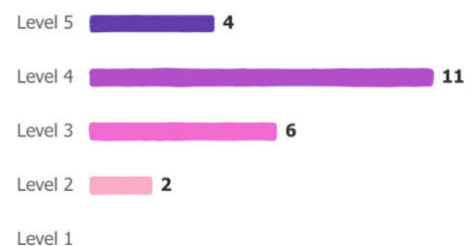
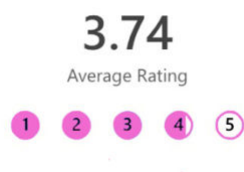


Figure 33 The Impact Of Playing Surfaces Condition

Yes	8
A little	11
No	5

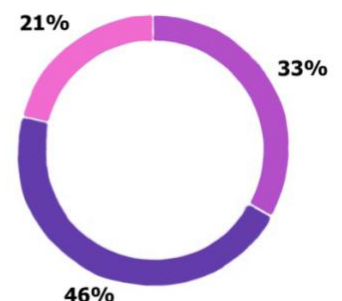


Figure 34 Players Fear & Anxiety To Play On Playing Surfaces

2.2.3.2 Coaching Survey Interview

Due to conflicting scheduling the coach participant was sent 5-minute survey to gain an insight into how they approach managing and coaching with injured players.

The coach revealed that they have witnessed a 50/50 split between ACL (tears & strains) and Ankle Sprain injuries, expressing in Figure 35, that first priority is player well-being before adapting to the loss of a player. The coach outlined that with adapting to the circumstance is crucial to their

job so too is supporting the player's recovery, seen in Figure 36, the three key methods to keep their player motivate is regular communication and engagement, setting realistic recovery goals and involving players in the rehab planning itself. Additionally, the coach implements prevention strategies which include strength and condition programs, and FIFA 11+ warm up routine to support their female players (see Appendix G).

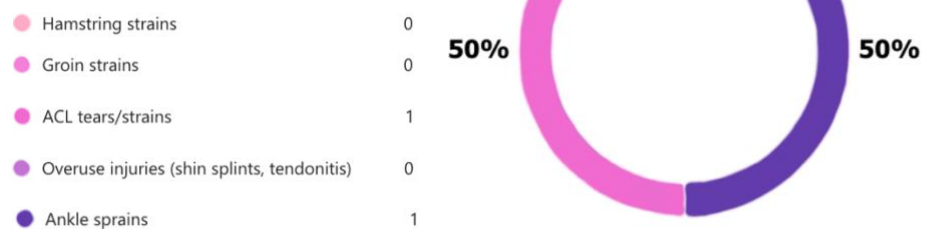


Figure 35 Common Injuries In Female Players

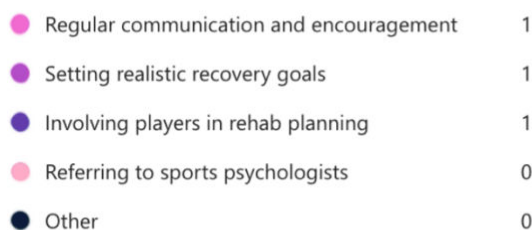
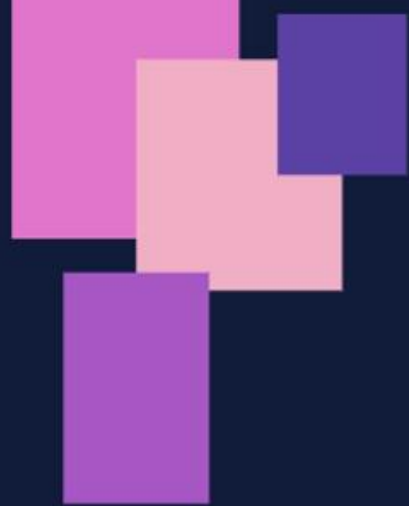


Figure 36 Coaches Support To Injured Players

Interesting the coach shared that they were not trained or prepared in how to cope with injured players, with their biggest challenge when managing an injured player is the limited resources (time, staff and equipment). The coach shared a strong belief that playing surfaces contribute to player injuries, suggesting the worst to be wet grass fields (see Appendix H) As outlined by Figure 37, the coach believes there is

Access to gyms or football clubs to have better resources to accommodate. Physio/strength and conditioning coaches to be included as coaching staff (full time). Such a key component, that have the skill sets to expertise over a football coach. They could manage team, individual workload and programs. (Participant, 2025)

Figure 37 Coaches Insight For Further Improvement In Female Football



DISCUSSION & DESIGN IMPLICATIONS

DISCUSSION

DESIGN
IMPLICATIONS

CONCLUSION





The primary research gathered from surveys, interviews and video observations closely correspond to current academic literature research, whilst challenging some established views. The research confirmed the urgent concerns female players face before, during and after injury, which were successfully seen through the research theme findings. Several pain points were emphasised, including individuality treatment, lack of resources, physical and psychological blockage.

1

INDIVIDUALITY TREATMENT

When treating injured players, specialists design rehabilitation programs specific to the injured players. This affords specialist and players discussions to implement specific exercises, goals and expectations that players follow through their rehabilitation (refer back to 2.2.1.2 and 2.2.3.2) However, injuries experience, pain rehabilitation and training can vary from player to player, often impacting a player's mental well-being, attitude and behaviour regarding appropriate training loads (refer back to 2.2.1.2 & 2.2.1.4). Although this can challenge how specialists develop and approach rehabilitation recommendations, as it is the player's decision to adopt professional advice, it is critical for specialist to discuss and find "the most important individual drivers for that person" to ensure player motivation is continued throughout the process (refer back to 2.2.1.2)

2

LACK OF RESOURCES

The lack of equal share of resources, greatly impacts how players learn, understand and receive effective injury prevention strategies to limit the frequency of injury risks. Although some educational training plans and explanation of workouts have been slowly adopted by team specialists, there are still gaps in who has the access to these learning opportunities (refer back to 2.2.1.4). This not only impacts the players attitude and behaviour going into injury prevention exercises or rehabilitation, but it also affects players belief that female football is not properly supported or cared about in comparison to males (refer back to 2.2.3.1). Which unveiled the underlying gender bias that female sports encounters.

3

PHYSICAL AND PSYCHOLOGICAL BLOCKAGE

Many participants from surveys and interviews outlined a great impact of physical and psychological blocks when trying to proceed with injury rehabilitation. Whilst the physical pain limited player movement and participation in sport, the psychological impact of "grieving" the ability of the limb and independence, greatly impacted players mental well-being. With some participants outlining the feeling of being a burden, fear of missing out of team and playing experiences (refer back to section 2.2.1.3). It was further elaborate that the "fear of the unknown" greatly impacted how players approached rehabilitation by either over or under anticipating how painful and long the rehabilitation process would be for them. This affected both players motivation and attitude to rehabilitation but also brought concern to how and when players could return to play (refer back to section 2.2.1.3).

3.1 D

The insights obtained from the various research provides multiple directions for design to be implemented in, as outlined by Figure 38, with urgent opportunities and gaps in the market for female specific devices through product design. The most urgent gap lies in the volume of women specific footwear, where there is an evident need for innovative improvement for designs to support female biomechanics. There are opportunities to design in developing devices to assist in strengthen a players physical and mental ability either for rehabilitation or injury prevention. Additionally, generating educational devices to inform players the purpose of exercises or body mechanics, could be a unique direction to explore. By focusing on these fields, innovative product intervention has the potential to enhance players physical and mental well-being. Ultimately, the design process should prioritise the needs of female players whilst ensuring the product is accessible, comprehensible and ergonomic specific for women.

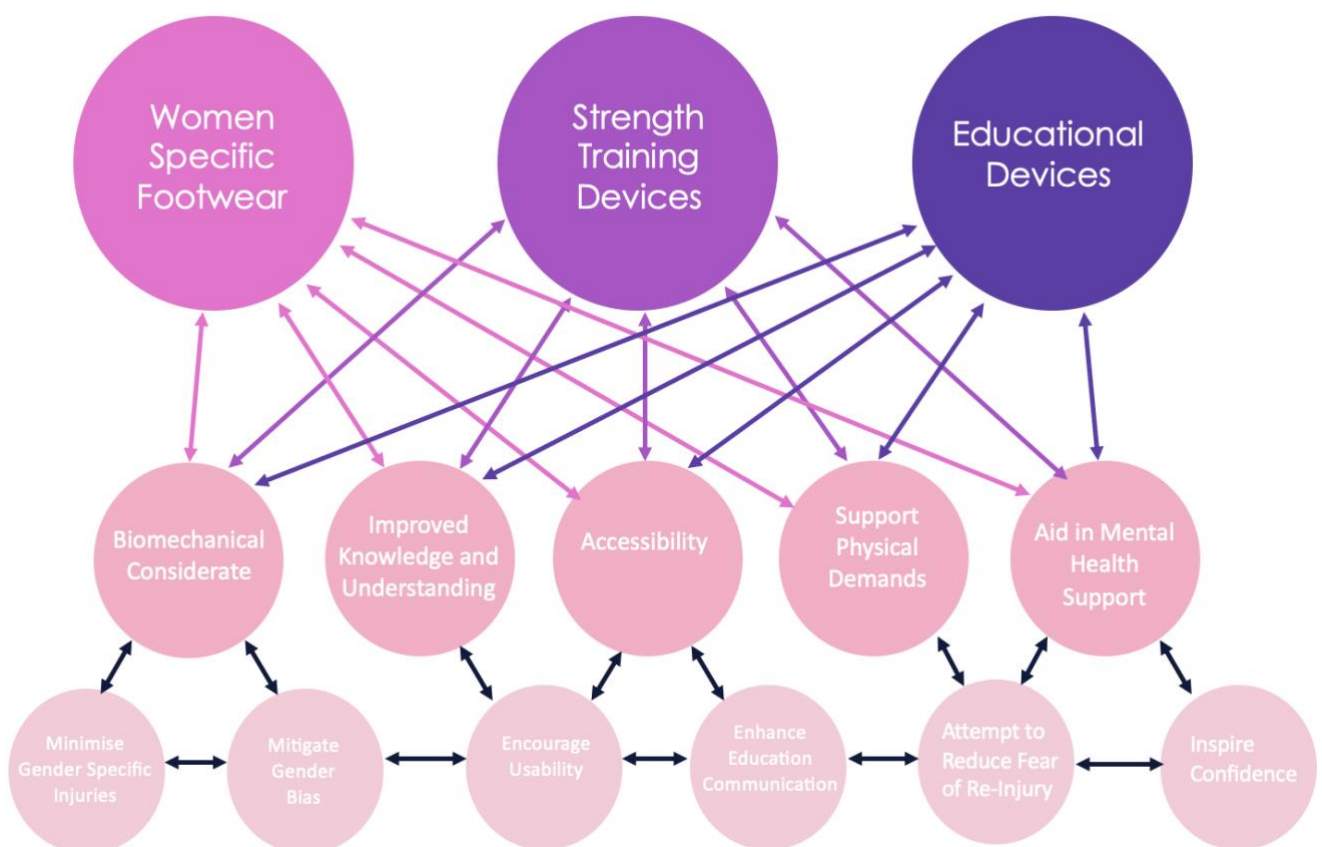


Figure 38 Potential Design Directions

3.2 Conclusion

This research set to investigate how and why female footballers face greater ACL injury risks in comparison to males and how potential design interventions could mitigate these risks. The findings confirmed that biomechanical, anatomical and hormonal differences, coupled with external pressure like overloaded match schedules, limited resources and insufficient rehabilitation support can significantly increase injury risks for female players. Beyond the physical strain, ACL injuries greatly affected player confidence, mental health and long-term well-being. The primary research, including interviews, observations and surveys align with existing literature whilst emphasising gaps in educational access, gender-specific rehabilitation approaches and individualised treatments. Importantly, the benchmarking revealed a lack of women specific football equipment, specially boots, presenting a critical opportunity for innovation. By managing both physical and psychological needs via inclusive, evidence-based design, future design interventions can support injury rehabilitation, prevention and player confidence. Ultimately this project reinforces the demand and need for tailored solutions that prioritise female players health, lifestyle and careers.

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5.0 Appendix

Appendix A

PARTICIPANT INFORMATION FOR CAPSTONE RESEARCH PROJECT
Interview
Running the Risk: Female Footballers' Susceptibility to Injury

Research team

Principal Megan Gall

Researcher:

Unit

Coordinator:

Rafael Gomez

**School of Design/Faculty of Creative Industries, Education and Social Justice
Queensland University of Technology (QUT)**

Why is the study being conducted?

This research project is being undertaken as part of an Industrial Design Capstone project, focusing on exploring how and why female footballers experience greater injury risks than male footballers for Megan Gall (n11589884).

The purpose of this project is to exploring how and why female footballers experience greater injury risks than male footballers. You are invited to participate in this research project because you represent the intended end user.

What does participation involve?

Your participation will involve an audio recorded / in personal interview at agreed location that will take approximately 1 hour max of your time.

Questions will include:

Can you walk me through what happened when you injured your ACL?

How did the injury affect your confidence in playing?

What have been the hardest physical aspects of recovery for you?

Did you experience any fear or anxiety about reinjury?

Your participation in this research project is entirely voluntary. If you do agree to participate you can withdraw from the research project without comment or penalty. You can withdraw anytime during the interview. If you withdraw with 2 weeks after your interview, on request any information already obtained that can be linked to you will be destroyed. Your decision to participate or not participate will in no way impact upon your current or future relationship with QUT nor affect attitude and perception towards you.

You will be able to review a transcript of your responses after the interview.

What are the possible benefits for me if I take part?

It is expected that this research project will not benefit you directly. The outcomes of the research, however, may benefit the understanding of female footballer injury rate and how design can be a helpful tool in designing within this problem. You can request a brief summary of the outcomes of the study by contacting me via email at n11589884.

What are the possible risks for me if I take part?

There are no risks beyond normal day-to-day living associated with your participation in this research project.

What about privacy and confidentiality?

All comments and responses are coded i.e. it be possible to re-identify you. A re-identifying code stored separately to personal information (e.g. names, address etc), will only be accessible to the research team, and the code plus identifying information will be destroyed when project ends (1/12/25). Any personal information that could potentially identify you will be removed or changed before the summary of results are disseminated or these data are shared with other researchers. The information that will be removed includes names, initials, postcode, date of birth, place of work, occupation, income, education, name of football club.

Any data collected as part of this research project will be stored securely on personal computers or password protected cloud storage systems (not on public storage systems). Data will be deleted once the project is complete at the end of the semester.

As the research project involves an audio recording:

- You will/will not have the opportunity to verify your comments and responses prior to final inclusion.
- The recording will not be used for any other purpose.
- Only the named researchers will have access to the recording.
- is not possible to participate in the research project without being recorded.

Every effort will be made to ensure that the data you provide cannot be traced back to you in reports, publications and other forms of presentation. For example, we will only include the relevant part of a quote, we will not use any names, or names will be changed, and/or details such as dates and specific circumstances will be excluded.

You can choose to have your comments attributed to you by name, or you can choose to be cited anonymously.

Yes ☐

No ☐

You will be identified as a participant in this research only with your specific consent, once you have read your interview transcript.

How do I give my consent to participate?

You can provide consent by confirming that you have read and understood the consent information via email. Your comments and responses may be identifiable in this research.

What if I have questions about the research project?

If you have any questions or require further information please contact one of the listed researchers:

Name: Megan Gall Email: n11589884@qut.edu.au Phone Number: 0490 453 460

What if I have a concern or complaint regarding the conduct of the research project?

The researcher is committed to research integrity and the ethical conduct of research projects. If you wish to discuss the study with someone not directly involved, particularly in relation to matters concerning policies, information or complaints about the conduct of the study or your rights as a participant, you may contact the Unit Coordinator on email (Rafael Gomez) r.gomez@qut.edu.au or (Tim Williams) tim.williams@qut.edu.au

Thank you for helping with this research project. Please keep this sheet for your information.

CONSENT FORM FOR CAPSTONE RESEARCH PROJECT Interview
Running the Risk: Female Footballers' Susceptibility to Injury

Research team

Name: Megan Gall

 Email: n11589884@qut.edu.au

Phone Number: 0490 453 460

Statement of consent
By signing below, you are indicating that you:

- Have read and understood the information document regarding this research project.
- Have had any questions answered to your satisfaction.
- Understand that if you have any additional questions you can contact the research team.
- Understand that you are free to withdraw without comment or penalty.
- Understand that if you have concerns about the ethical conduct of the research project you can contact me on email n11589884@qut.edu.au
- Understand that the research project will include an audio recording.
- Agree to participate in the research project.

Please tick the relevant box below:
☐ I **agree** for the interview / focus group to be audio / video recorded.

☐ I **do not agree** for the interview / focus group to be audio / video recorded.

Name _____

Signature _____

Date _____

Please return the signed consent form to the researcher.

Link To Completed Participant Consent Forms:

https://drive.google.com/drive/folders/1AKjxNf28aQ28TwDWIresTA_6NO7228Pm?usp=sharing

Appendix B: Interview Transcript

MG: How have you kind of gone through those challenges?

I: um, I think initially it was like placement was a good distraction, because I had something hard to keep trolling away at. But then once placement ended, that's when it really kind of hit, because I finished, I pretty much finished placement on the Thursday, and then I had surgery, like four days later, yeah. So like, those four days, it was like prepping myself to be like, oh shit. I've just gotten spent six weeks being able to walk again, and now I'm gonna lose it all again, because I had to do the six weeks of prehab beforehand, which was kind of nice to to have that, like, thought to work towards something. But like, of all my injuries, this has been the one that I've hated physio the most for. Yeah, it doesn't progress as quickly as my ankle did. And it like I've had a lot of times where, like, I haven't had any progression at all, okay, which I hate, um. And then the main sort of things I've been trying to do was, initially I was crocheting, um, lovely, just to, like, do something with my hands, be doing something, anything, um, but then after the surgery, because I'd use that as my initial thing, I didn't want to crochet again. Like, it kind of like, was, like, I associate with that with my knee. So it took me a while, but I started crocheting again recently. What are you doing? It's my cousin's Tony, so I'm making her a skirt because they're going to Bali, and I was invited, but it's when I graduate, so I'm not going wear a little skirt to wear in Bali stuff. That's my little thing, just to do something I write down in a journal. A lot stupid, just to get it out of my brain, I cry a lot to Hayden. Unfortunately, it's had to most days. Is a cry just about something with my but that's, yeah, I have considered going to see a psychologist, because it got pretty bad, but then I got scared to go access the psychologist,

MG: With that support, how crucial has like your boyfriend been to your support?

I: He kind of took over being my main, like a support for me, because Mum was grandma was sick at the same time. So Mum was kind of focusing that way she could focus on grandma, whereas me. I think that if I didn't have [Boyfriend], like he was staying at our house, so then it was kind of like I always had someone there, whereas if I did him, like, it would just be kind of me alone in my room, yeah, so would have been getting that increased, like, loneliness, but at the same time, like, he could only do so much, and I didn't want to put too much on him, yeah, I would still kind of keep it to myself a bit.,

MG: Has the club been helpful? Like, were there any help?

I: To an extent, yes, like, initially they were really good with like, the process of saying, like, Oh, here's the links to do your claim. And they've talked to me about next year potentially coming in and coaching since I won't be able to play, anytime I see like, anyone, like, they always check on me. I don't really know what their role would be to support me, if that makes sense. Like, I think to an extent, they've done enough, yeah, that he can do because they've just checked but like, I don't know what I would expect more of you know, if that makes sense.

MG: Yeah, have you, like, teammates or coaching staff and any help as well,

I: to an extent, yes, but at the same time, I hated going and watching, because it was like that I could be on the field, yeah? So if anything, like, I wanted to show up because I was in the team, I committed to the team, but, and, like, I wanted to support everyone, but I used

Link

To Interview Transcripts:

https://drive.google.com/drive/folders/1AKjxNf28aQ28TwDWIresTA_6NO7228Pm?usp=sharing

Appendix C Coding Method

playing netball? She went to take an intercept on the court, landed funny, complete dislocation of the knee. ACL, MCL, PCL, typically, and for both of those young girls, they had a hamstring graft.

So I'm not sure if you're familiar what that is.

MG: shakes head no,

I: Pretty much they take part of your hamstring muscle and they create a new acl from the hamstring.

MG: Oh, cool, Which is quite innovative, quite awesome, when you think about it.

Both nod in agreement:

I: That's probably one of your big hurdles psychologically, is knowing that, hey, this is muscles now on the back of my leg, and now it's in my knee. And the thought of going, obviously, both girls have surgery, so surgery can be a really daunting thing for a young girl. I certainly if I had had surgery at 15, I'd be freaking out. However, like it's quite daunting. Hamstring strength is directly correlated to your high speed sprinting, so you're going from being a both these girls are good athletes, like, they weren't like, necessarily weak athletes or lazy athletes. They were good athletes who just sort of stepped at the wrong place at the wrong time, yeah, which is quite unfortunate, and when we look at that, they're probably both high speed sprinters. They know how to sort of run. They're both athletic. They've gone from, yep, I work perfectly fine, fine mechanically, to now I have one less hamstring on this side. There's a mental block as they return to sort of run and return to play that they know they can't sprint is fast because their hamstring is weaker and they've lost part of it. So that's definitely a psychological barrier. And I think anyone, I think regardless of age and gender, would experience them.

The two men that I dealt with were very much like, go getter in type of attitude, like, not great at listening to like, hey, you need to rest and need to ice it and do like they want to push through pain. They want to push through they want to get back on the pitch. Your ACL rehab timeline, according to the Melbourne protocol, is nine to 12 months. I don't agree with that. I think it should be 12 to 15. You could probably even say 15 to 18. And you, unfortunately, see it in a lot of professional sports. Well, I'll push him on to the nine the 12 mark. And even, like Sam Powell from Port Adelaide Football Club, he's done his third ACL. He's a middle aged man like for him, that's unfortunately looking to be career ending. Now, I don't know anyone in the Port Adelaide football club, but when you do consecutive ACLs, ACL is one of those, really, it's a topical injury at the moment, but it's one of those ones that brings along a comorbid, comorbidity of other injuries that is recurrent ACL on the same side of the other side, hamstring tears, quad tears, sort of gastrocnemius problems, so like your calf problems and ankle problems, because you're pretty much like, relearning how to do everything. It's a pretty gnarly injury. Often they are quite traumatic. Unfortunately, they're not like, yeah, both the young girls that I worked with, they're all like, yeah, like, I'm really nervous to get back out there. There is a psychological block to going out there, because they know what it felt like to be in that excruciating pain.



 Megan Gall D1 

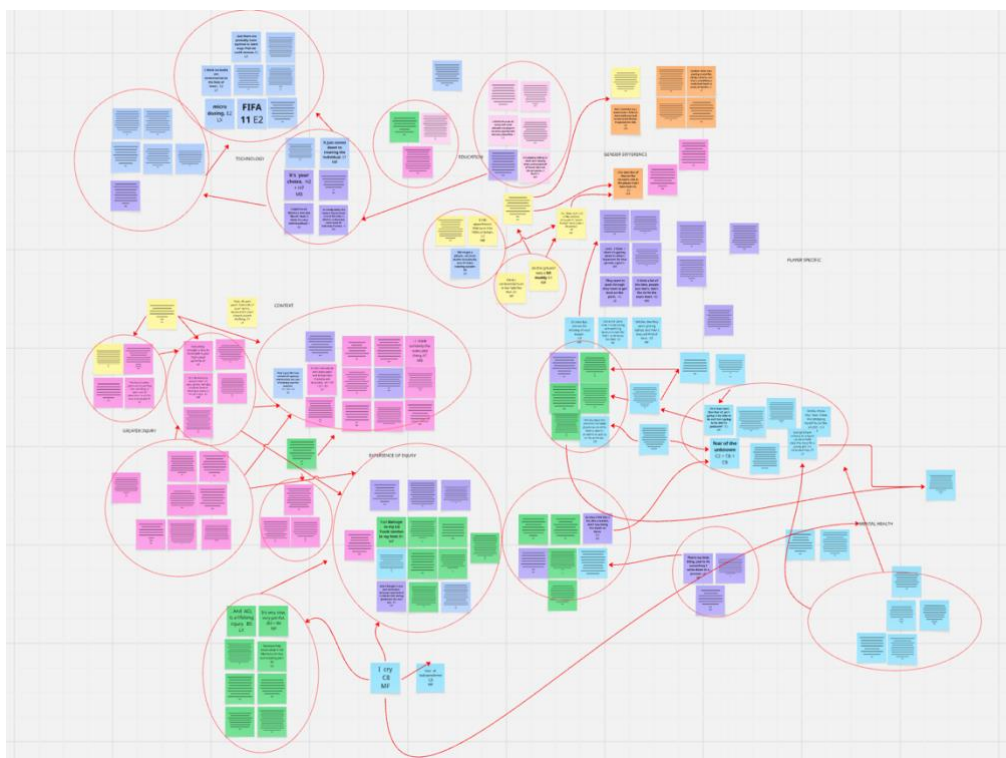
Reply 

 Megan Gall C6 Reply  Megan Gall C3 Reply  Megan Gall A1 Reply  Megan Gall C6 + C2 Reply  Megan Gall A4 Reply  Megan Gall L1 

Link To Decoded Interview Transcripts:

https://drive.google.com/drive/folders/1AKjxNf28aQ28TwDWIresTA_6NO7228Pm?usp=sharing

Appendix D Forming Connections From Interview Notes



Link to Board:

https://miro.com/app/board/uXjVJOSTP7A=?share_link_id=18844423028

Appendix E Observation Video Notes

Step by Step: Beth + Viv ACL Journey

⇒ Vid 1 (Trailer)

↳ Initial reaction = disbelief + devastation

⇒ Viv + Beth = Partners & ❤️

Mill dollar Question = Why

Ep 1: Football was my happy place

Beth

↳ When I play the game nothing else in the world matters... nothing else in the world exists... all the sadness goes away

When not able to play

'Mental + Physical torture'

Gray Lewin: Head of Performance services @ Arsenal Women FC

⇒ Timestamp = 2:25 goes into knee ligaments & how typically players pull cruciate ligament

⇒ Mechanism of injury - normally have a player that is sort of semi-flexed, fully weighted - bearing with some rotation

↳ thus knee tends to buckle inward

↳ and then that puts stress on the anterior cruciate & it ruptures

Nov 2022

Beth: "the day of the game, I think there were a lot of mixed emotions for me"... we before left England camp as her mum

↳ sick with cancer

"I woke up that morning feeling excited, playing at the Emirates in front of a big crowd against one of the best teams in league"

The Game - Timestamp 5:18

⇒ tough start - Op went 1:0 ahead

↳ Arsenal got back into game 1:1 the 1:2

↳ Op game back = 2:2

↳ "You start to panic a bit more... the game becomes a bit more end-to-end, a bit more physical."

↳ Op goes 5:2 up

"I think it was quite late on in the game that it kind of takes a lot of energy out of you"

Beth recalling how she did her ACL

⇒ "I ran after a ball that never would of in that point of the game - but we were losing so why would I not try & keep it in?"

⇒ Watching the vid, Beth was push shoulder - to - shoulder, which is legal, but due to how fast she was going

"I planted & got nudged in a different direction running at quite high speed... And the pain that follows that was not very nice"

"The team were quite frantic at that point - wanting to keep the game moving, but I'm in a lot of pain & no one really knew why."

Viv perspective

The moment Beth got injured against Man U, I thought she had hurt her ankle. So, I told her to get off the pitch. But very quickly, when I saw the way she was grabbing her knee, I thought Oh that's no good.

Beth:

I remember the pain setting maybe 30 sec to a min after & thinking, I might be OK here,

↳ I think deep down, I didn't want to think it was this injury.

↳ maybe I've just tweaked something, but not the dreaded ACL.

Beth: I felt like someone had just gone into my knee & hit either side with a hammer"

↳ movement felt slow, even though on vid it was quite quick

Beth: "So much pain to then disappear within a minute or so was a bit of a weird feeling & pause"

Yeah, I always try to be positive, walked off & thought maybe it's just tweaked, or I've just caught it wrong or it's banged against the bone or shoulder it may be

The next day I went for my scan, got back from the scan 20 min later, & the physios already stood there, waiting to take me into a room to tell me I've ruptured my ACL.

↳ knowing a World Cup was coming up, a full season for Arsenal still to play, & I knew I'm probably not going to be playing any of them was tough.

↳ a lot of thoughts go through your mind quite quickly

Viv: there's not much you can say, feel or do. I think, at that moment, I went down, I sat with her - other teammates came in & sat

⇒ It's really sad because you know what she was going through, & there's just nothing you can do.

Beth: Yeah, it was my time I cried, & then after that, I've tried to just get myself through. Unfortunately, that is what it is. Although it's not an ideal injury, it gave me precious time with my mum. So, that's why I always say I believe that things happen for a reason.

Viv ACL Injury: December 2022

"The pitch was my happy place"

⇒ First 30

32 min (roughly) went down, started having migraine & was like

On might need to come off at half time

↳ coaching staff basically "that's fine, let's just finish the first half"

2 min before half time = injury occurred

⇒ Lead up to the game wasn't great

↳ "probably should've pulled myself out, but it's really hard to do that as a player."

Beth: I saw her go down & stay down

↳ I think when Viv stays down on the floor, there's something wrong

Viv: Yes, I felt let down by, probably, my own decision-making.

⇒ Once I planted my foot, I obviously heard a massive pop.

↳ I had a lot of pain ⇒ never felt anything like that in her life

⇒ I knew straight away that I had done my knee

one first moment when I actually fell down...

I can't drive Beth home for Christmas, which I'd promised for her to spend time with her mum.

⇒ Second thought = done my ACL

↳ teammates tried to calm her down - reassure her that she shouldn't jump to conclusions but Viv knew

⇒ Similar thoughts of missing special events

↳ teammates were sad - very sad

⇒ Very emotional journey - both partners live in same house, both did their ACLs

January 2023 - Viv had her surgery.

Gray Lewin: Head of Performance services @ Arsenal Women FC

↳ I think the initial reaction from the squad was, as it was with all of us, devastation

↳ not only because two of their players have got the same injury, the fact Viv & Beth are partners, & the fact it was still fresh in the memory that Beth's injury occurred, I think makes still disbelief

↳ we looked back over the years at Arsenal WFC & other women teams, average 3 ACL a year, we went a couple maybe 3 yrs, all of a sudden team experience a load of players doing their ACLs

↳ it's very unusual, it's opening up the debate as to why?

Viv: I do think it's something we need to discuss & we do need to speak about, but we do need to do it in the right way

↳ G.L. = "there's a big psychological element to this"

Timestamp 16:51 - Beth: 116 Days since Surgery
 → in gym doing box steps down
 ↳ mainly on own - because (at the time) not many injuries throughout the team.
 ↳ bit awkward → like company but you only have that company because your teammate is injured.
 ↳ "I think the difficult thing with an ACL is the ones that get injured now, they're still in & out before you're even out again.
 ↳ You've got to learn to agile, you've got to learn how to run on the pitch again - your muscles disappear, you've got to build them back up - you've got to teach yourself how to walk without a limp".
 A lot of re-learning/building up

Context: Beth is in Gym doing squat exercise
 ↳ Not enjoyable not at all
 "It's difficult some days; you could go through full programme on your own & not talk to anyone for a couple hrs
 "it's difficult"
 ↳ "it's a tedious & long process for all of us who are going through it - there's a lot of ups & downs within this rehab

Timestamp - 18:20
 Beth running in anti-gravity treadmill

Timestamp - 19 min
 Viv just out of hospital
 ↳ family came to support & help - added/made shower chair
 ↳ Arsenal staff (physio) did home visit to check on Viv & her leg movement

Timestamp - 19:52 Date: April 2023
 Beth - 143 days since surgery
 ↳ Special Day = Getting to go run on pitch = very light training
 ↳ main squad doing their decision about cheering on
 ↳ Beth as she makes her gradual return
 "it's a really nice feeling"
 Training - basic leg/muscle activation, basic one-touch passing, straight line running

→ Both players Viv & Beth still positive & know although injured know they still have a job & purpose on team
 ↳ support team

Episode 2

→ Another Arsenal player got ACL injury (Laura)
 ↳ Beth & Viv got her more in / stay with them
 ↳ all support one another

Laura - "to be fair, I know it's part of the game and since it happened, I haven't really had a negative thought or anything, I knew I would be in good hands."

Close after Laura, Leah also did her ACL
 ↳ Company + support → key factors

Timestamp: 5 min → Viv first time running in on anti-gravity treadmill
 "bit nervous"
 Viv
 ↳ Gym sess = mainly on own but great to get company from rest of girls - (not injured)
 Viv
 "When I look at me & Beth, it's quite frustrating for me to be a month behind, because I always thought 'I need to move in a month time... I should be competing, but I think in the beginning, I struggled a bit with that.'
 ↳ Beth had a diff surgery only ACL - Viv had ACL & two surgical

Milestone - today - Viv very nervous/anxious
 ↳ teammate supporting Viv while runs for the first time
 "Beth really nice to run to be 'free' again"
 ↳ it's a close/supportive group of players & staff
 * Was a turning point for Viv's rehab

So, during Beth & Viv rehab more teammates + players got ACL injuries, thus sparked Beth + Viv in wanting to dig deeper into this growing issue

Timestamp 12:39 → Beth + Viv meet with G.L

GL: "there are so many different factors that come into play, some well documented regarding the menstrual cycle, the body shape, biomechanics"
 ↳ club questioning own strength conditioning
 ↳ Scheduling! is crazy season to tournament

GL: "You can't prevent these happening, these are all part & parcel of being involved in sport, but it's about mitigating the risk."
 GL: From a playing perspective, the fact you're injured during the summer means you're missing less games - so being selfish, it's a good time, but also, it's probably the hardest time for you mentally because they're no one around
 ↳ teammates gone to international tournament = World Cup 2023

GL wants to figure/discuss how to keep these players motivated

Ep 3

June 2023 Beth - 176 days since surgery
 ↳ more intense training, faster
 Beth shore saw of moving out in playing in a major tournament - we had each other to understand & support one another.
 ↳ Get experts/researchers in to talk to Beth + Viv
 ↳ Anthony Lockney: Expert in female physiology & the menstrual cycle
 ↳ Andrew Lawson: Specialist in Psychology & mental health
 ↳ Helen Elliot - Sole: Expert in female Endocrinology & exercise physiology
 ↳ Alan McGill: Specialist in Injury Prevention is Eric Sutherland
 ↳ Robert Kypar: Expert in female biomechanics & sport equipment
 ↳ Beth & Viv both believe physiological factor greatly influenced
 ↳ Beth: Mum getting sick
 ↳ Viv: Menstr

Timestamp: 4:00
 Context: Having a Group Discussion Talking about the various issues & reason why things happen
 AL: I think the single, not factor from a psychological point of view is stress or history of stressors
 Viv - Context asked about her mental fatigue.
 Viv: Yeah, I got two weeks off from the club in Nov, then when I came back to the club, I actually felt really fresh, I felt good.
 ↳ Day before found out that Beth's mum wasn't doing well → Viv: So I think that night was really emotional
 ↳ Viv told coaching staff: "I haven't slept well, I'm feeling tired, & maybe it's just see how I feel in the warm-up."
 ↳ coaching staff very supportive
 Beth's mum was dying of Cancer
 GL: Work hard to monitor player health but at the end of the day it's player's decision & love to play
 ↳ Beth: "It's your way of coping things, I think, isn't it? For me, after losing my mum, all I wanted to do was kick a ball" when was taken away from Beth cause of her injury
 K.E.S: "I'd speculate that all these risk factors or components that perhaps lead or contribute to your injuries, I don't think they're in set proportions, I think there are all of these pre-determinants, & some days, one is higher than the other, it then another day, it flips again. It's when they come together in that moment is the perfect storm."
 GL: there are not one or two factors; it's multi-factorial

AL: ...depending on you as an individual, one of these factors on a given day could be very much putting you at risk, but the next day, it could be another factor in that fact that could be putting you at greater risk
 GL: "I've been involved in men's football a long, long time. In the men's game, we get the boys from the age of 9 and they do a lot of strength & conditioning, technique training & loading, whereas in women's football, I'm finding that we often don't get you going until 18. You'll have had limited access to strength & conditioning before that... I believe that could be a component of why we're getting so many
 K.K: "there's a discrepancy between men & women & how they're covered for young boys learn to move like athletes & young girls learn to move like good footballers but necessarily athletes... there's a big change that needs to happen there, to make sure where generations are on equal terms between the men & the women... Context: women playing in little football boots
 ↳ "...or even worse, in children's football boots if they can't fit in an adult's size
 ↳ "the subtleties of the game & the interaction with the surface... but that is for the needs of a man"
 ↳ women are lighter, they have smaller feet, they often play on different surfaces, the men play on hybrid, & women play on natural grass most of the time, and those pitches are probably not always in the best condition either. Definitely, we need that football boots to be designed for women, & it's needed to minimise the risk of injury.
 GL: "We try our best to monitor & get a feeling in terms of whether it's how the girls are but it changes moment to moment. How do you make decisions for the good of the team, but also individualise your decision-making to protect these girls (the girls) as individuals? In elite sports that's the biggest part."

Viv: it's depending 'is communication + trust

Timestamp: 10 min

↳ having trust between player & practitioner can limit the possibility of a player lying & putting their body + injury

Timestamp: 11:30 min

Viv: "I think the biggest change within women's football right now is that instead of playing 25 games a season, we've gone to playing 50 games a season

KK: there's no easy solution, unfortunately... but it's taking all of those factors into consideration & trying to optimise them. And you have a really good support staff set-up to sort of help you with that. And of course, as we've talked about, learning & educating yourselves as well so you (the players) can help in that process

Timestamp: 13:03

Sep 2023: 265 days since surgery

↳ Beth is back training with squad

↳ "tough grind physically + mentally - Beth

Timestamp: 16:25

↳ Amy Ardurdale: "specialist in ACL injury prevention & rehab

Why?

↳ D.A. - "I think they're too many components

KK: "I think there are two parts to it. So there's nature: we are, as women, different to men. And I think a lot is blamed on that. So, a lot is blamed on the menstrual cycle, & probably... there's definitely something in there, but it's not the only thing. Because then, men wouldn't have ACL injuries if that was the only causative factor.

Women have smaller ACL

KK: "in the media especially, is around women being fragile, they shouldn't do sport. I think that's the completely wrong message to send out there. I think we should start with all things that we can actually change. Controlling the hormonal cycle & understanding it better is one piece, but also pitches, access to gyms etc.

↳ we can actually design in the environment rather than change the females themselves" - KK

Ep 4

Viv June 2023 - 175 days since surgery

↳ Mental Health Focus

Viv: struggled with pressure in her career

↳ become more guarded

↳ but if I start letting people in it can help/relieve pressure

also can improve my performance

↳ Viv has gotten very anxious - foot injury

↳ Viv is also a player that knows her limit - when to not to play game

↳ in vid Viv first run on pitch - 6 min Timestamp

↳ very anxious

↳ knows injury is apart of football

↳ Players have gotten more wary / aware of own body limits

↳ because so many of their teammates got injured

↳ Viv: we don't want to scare off

Beth: Week before her doing her ACL: "toughest week"

↳ Beth's mum was dying - difficult to leave - thought may be

last time seen her

↳ mental stress = contributing factor

Viv: before Viv ACL game

↳ got call Beth's mum had a couple weeks left

↳ Beth dealing with post-op

*Mental + Emotional Stress = Great Contributor! *

↳ 7th Jan 2023 - passed away in sleep @ home - Beth's mum died

Oct 2023 - Beth plays first interval game - timestamp 15 min

↳ 307 since surgery

↳ Viv still at but training on sideline as game is played

↳ game not full game intensity - not wearing shin guard

↳ is a thing players/teams do play games each squad

Ep 5

↳ there's aqua therapy

Oct 2023

↳ Beth read back in squad - 312 days since surgery
↳ on way to Arsenal Beth watches league game, Man U player does ACL

↳ Second half

↳ Beth Mead is subbed on

"I was quite emotional" Excited, nervous

↳ playing like nothing happened - my observation

↳ Beth set up/assist in goal arsenal 2:1 opponent

Viv: tough to watch: nervous

↳ First match since her mum passed away

↳ Beth very happy to be back - 15 min

Timestamp: 17 min

Viv: 290 days back into squad

Viv:

↳ it's not as straightforward, a lot of physical + mental

challenges

↳ players have to listen to body - know limit - have right

people around helps

↳ would be exciting + great to come back w/ Beth on

field together

Viv = more cautious

Viv = very passionate about this issue + protecting players

Last 5 min Viv subbed on

↳ clip to Beth = Beth had more time on field

Beth = "more hungry than ever because of how much I've missed"

After game both do specific cool down movement

Oct 2023

↳ talking with Paudie how much club is doing

↳ coaching staff

How has club changed - did internal + external review, talked to

other clubs + female sport rugby, hockey etc.

* Stat in European clubs 62 ACLs

27 girls missed World Cup

Demand on playing is increasing

↳ But coaching staff trying to modify + support conditioning of players

↳ these injured players were

↳ jump between girls to women is still big (pro)

↳ You can't stop injuries

↳ James Housman - apart of Arsenal Academy

↳ Speed + demand has increased

↳ start training up into athletes

↳ Coaching staff educating players on body, men cycle, diet

↳ The Gap from girls to women is still big.

↳ some players making debate at 16.

Appendix F Survey Access

e



 ATTENTION FEMALE
SOCCER PLAYERS 

Hi there, I'm doing my final research project for Industrial Design and I need your help!

I'm researching why female soccer players may be more prone to injury than male players, and your experiences can help shed light on the causes and lead to better prevention strategies. Here's the link to my 5 min survey...

 Forms.office.com

Your participation is completely voluntary, and you can skip any questions or stop at any time. Your input is truly valued and appreciated!

Appendix G Use of Injury Prevention Strategies

Which injury prevention strategies do you implement with your female teams? (Select all that apply)

1 Responses

ID ↑	Name	Responses
1	anonymous	["Strength & conditioning programs", "Warm-up routines (e.g., FIFA 11+)"]

Link to Coach Survey Results

<https://forms.office.com/Pages/DesignPageV2.aspx?origin=NeoPortalPage&subpage=design&id=o1IL3MVo90SIHZOD2IULq7WnHwxRLNFnz576xV7jDIUQVFZSINMNk0yNkQwRTdWVkpCN0IEQk42MC4u&analysis=true>

Appendix H Opinion on the worst types of surfaces that increase injury risk

17. Which surfaces do you believe present the highest injury risk for female footballers? (Can select more than one option)

1 Responses

ID ↑	Name	Responses
1	anonymous	["Natural grass (wet)", "overuse worn pitches, uneven surface are the worse from my experience "]

Link To Football And Coaching Surveys

<https://forms.office.com/Pages/DesignPageV2.aspx?origin=NeoPortalPage&subpage=design&id=o1IL3MVo90SIHZOD2IULq7WnHwxRLNFnz576xV7jDIURUNMR1Y1VkQ5SE45Q0JGSDJH MkZHS0FIQS4u&analysis=true>

<https://forms.office.com/Pages/DesignPageV2.aspx?origin=NeoPortalPage&subpage=design&id=o1IL3MVo90SIHZOD2IULq7WnHwxRLNFnz576xV7jDIUQVFZSINMNk0yNkQwRTdWVkpC N0IEQk42MC4u&analysis=true>