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Rehabilitation of a lateral ankle reconstruction in a male professional football player – A narrative case report

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ABSTRACT

Objectives: Lateral ankle sprains involving the ATFL and CFL are common injuries in football with a high recurrence rate. There is a lack of research to guide post-operative rehabilitation of football players following lateral ligament ankle reconstructive surgery. This narrative case report discusses the management of a lateral ligament reconstruction in a male professional football player.
Methods: A 25-year-old professional footballer underwent a lateral ankle reconstruction following recurrent lateral ankle sprains leading to an unstable ankle.
Results: Following 11-weeks of rehabilitation the player was cleared to return to full-contact training. The player competed in his first competitive match 13-weeks post-injury and completed a 6-month full-training block, without episodes of pain or instability.
Conclusion: This case report illustrates the rehabilitation process of a football player following a lateral ankle ligament reconstruction within a timeframe expected in elite sport.

1. Introduction

Within an 11-year follow-up of male European Champions league football injuries, lateral ankle sprains (LAS) accounted for 51% of all ankle injuries and had an 11% recurrence rate (Waldén et al., 2013). In four consecutive seasons at an English premier league football club, LAS accounted for 32% foot and ankle injuries and had a 29% recurrence rate (Jain et al., 2014). This data highlights the significant burden LAS place on medical and physical performance departments working in professional football.

LAS refers to damage to one or a combination of the three ligaments making up the lateral ligament complex: (1) the anterior talofibular ligament (ATFL), (2) the calcaneofibular ligament (CFL) and (3) the posterior talofibular ligament (PTFL) (van den Bekerom et al., 2013). Combined inversion and plantar flexion is the most common mechanism of injury for a LAS. In outfield players the majority of LAS are sustained during a contact situation (59%), whereas in goalkeepers the majority are sustained in a non-contact situation (79%) (Wood, 2003). All three ligaments resist inversion but the ATFL is most commonly injured because it is maximally strained in plantar-flexion (PF) (Takeuchi et al., 2021) and has the smallest load capacity (Colville et al., 1990; van den Bekerom et al., 2013). Combined ATFL and CFL ruptures occur in 20% of LAS but isolated CFL injuries are very infrequent (Brostrom, 1966). The PTFL is rarely injured, this is because it has the largest load capacity and is lax when the ankle is in PF (Colville et al., 1990; van den Bekerom et al., 2013).

LAS are most commonly classified from grades one to three depending on the level of structural instability on clinical assessment and anatomical disruption on magnetic resonance imaging (MRI) (White, McCollum, & Calder, 2015; Lee et al., 2012). MRI also identifies whether any associated injuries are present which can complicate the return to play process (Wijnhoud et al., 2022). For example, osteochondral lesions or syndesmosis injuries are reported to be present in up to 50% of sporting LAS (Saxena & Eakin, 2007).

Twenty percent of acute ankle sprain patients develop chronic ankle instability (CAI), causing recurrent sprains, pain, swelling and fear avoidance (Al-Mohrej & Al-Kenani, 2016). CAI is characterised by a combination of both mechanical and functional instability

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(Kaminski & Hartsell, 2002). Mechanical instability occurs when ligaments fail to remodel to normal length following injury, resulting in excessive motion at the joint (Hertel, 2002). Functional instability occurs when tissues, rich in proprioceptive nerve fibres, are damaged reducing neuromuscular control (Hertel, 2002).

Surgical management is typically preserved for patients with persistent CAI symptoms that have failed conservative management (Al-Mohrej and Al-Kenani, 2016; Walls et al., 2016). However, improved objective stability and faster recovery have been noted after surgical management for acute LAS compared to conservative management (Guillo et al., 2013; Kerkhoffs et al., 2007). Since instability is a predictor of recurrence and the possibility of a shorter recovery time, a consensus statement suggested surgical management of acute LAS should be considered in an elite athlete (Guillo et al., 2013). An anatomical reconstruction, such as a Brostrom or Modified Brostrum-Gould, is often chosen in sport because it does not restrict subtalar movement, allowing normal hindfoot biomechanics and movements needed for sports (Guillo et al., 2013; van den Bekerom et al., 2013).

Some studies have discussed rehabilitation following a lateral ankle ligament reconstruction, suggesting return to sport timeframes of four to six months (Hunt et al., 2017; Pearce et al., 2016). However, in professional sport, return to sport timeframes following a lateral ligament reconstruction is reported to be around 10 weeks (Hong & Calder, 2022). Despite the high incidence of LAS in football players, there are no studies that discuss the rehabilitation process for a football player or elite athlete returning to sport following a lateral ankle ligament reconstruction in the timeframes identified by Hong and Calder (2022). This case report provides clinicians with information and guidance for the rehabilitation process of a football player following a lateral ankle ligament reconstruction within a timeframe expected in professional sport.

2. Patient case

This case uses clinical reasoning to describe and illustrate the rehabilitation of a lateral ankle ligament reconstruction of a 25-year-old male football player who has competed in the top three leagues of English professional football.

This was the player's third LAS in two years. The player's first two injuries were grade-two LAS and in both instances, six and seven-week periods of rehabilitation respectively were completed prior to return to sport. In both cases the rehabilitation restored the structural stability on ligament testing, range of movement and muscle strength of the ankle joint. However, the player exhibited residual proprioceptive deficits following the first and second injury. This deficit was noted performing the star excursion balance test (SEBT), a common feature of CAI in athletes (Doherty et al., 2016) and was highlighted as a key component to address during the rehabilitation process.

The first LAS occurred following a contact mechanism to the medial aspect of the ankle forcing the player into inversion. The second and third injuries were non-contact mechanisms, with the player going into inversion and PF when attempting to change direction. As discussed, non-contact mechanisms are less common than contact mechanisms (Woods et al., 2003) however, a previous LAS has been shown to predispose athletes to sustaining a non-contact LAS (Tyler et al., 2006). The player opted to wear an ankle strapping aimed at resisting inversion and PF for training and games after the first LAS and was wearing an ankle strapping at the time of the second and third injury.

In the most recent case, the clinical examination of the ankle joint was delayed until five days post-injury to allow for pain and swelling to diffuse and so increases the reliability of ligamentous stress tests (Gribble, 2019). The ATFL was assessed using the anterior drawer test, which has a sensitivity and specificity of 0.96 and 0.84 respectively (van Dijk et al., 1996) and the CFL assessed through a rotational stress to the talocrural joint. Grade-three LAS was suspected due to a positive ‘sulcus sign’ within the sinus tarsi on anterior drawer and significant laxity into calcaneal inversion plus a soft end-feel during the talar tilt. An MRI was completed on six days post-injury, which confirmed grade-three injuries to the ATFL and CFL.

Given the combined clinical and radiological picture and the recurring nature of the injury, it was clinically reasoned that the player had a high-risk of repeat injury. Therefore, following discussion with the player, multidisciplinary team (MDT) and orthopaedic surgeon, the decision was made for the player to undergo anatomical reconstruction of the ATFL and CFL. The Modified Brostrum-Gould procedure was completed eight days post injury. During the procedure the ATFL and CFL are debrided and attached with anchors to the fibula. To reinforce the reconstruction the inferior extensor retinaculum was stretched over the ATFL and sutured to the fibula.

3. Post-surgical management

Omitting the weightbearing and protection protocol, which was time-based and governed by the surgeon based on the biological healing of the reconstruction, the time spent at each phase of rehabilitation was only noted retrospectively and the player was cleared to progress to the next phase of rehabilitation following the completion of the specific exit criteria. Criteria-based rehabilitation rather than time-based rehabilitation ensures that the level of rehabilitation does not exceed the capacity of the ankle or progression is not delayed needlessly.

The outcome measures included within the exit criteria for each phase of rehabilitation are detailed within Fig. 5. The outcome measures were selected based upon the impairments commonly targeted following a LAS (Tassignon et al., 2019; Wikstrom et al., 2020) and the key physical attributes of a midfielder as discussed with the MDT.

The target scores of the outcome measures were individual to player and established with reference to: (1) the player's pre-injury physical-profiling data, (2) the contralateral limb – which was tested day-two pre-surgery to determine a true baseline that is not impacted by the inevitable deconditioning that would occur as a result of the weightbearing and protection protocol, (3) relevant literature and (4) the collective experience of the involved clinicians.

3.1. Weightbearing and protection protocol

Following the surgical procedure, it is paramount the tensile strength of the bone-ligament interface was prioritised so that the reconstruction could perform its role in preventing excessive joint-motion. To establish high-tensile capabilities of the bone-ligament interface, mechanical stimulus is necessary (Bedi et al., 2010; Dagher et al., 2009). Therefore, following two weeks of immobilisation and elevation to mitigate risk of infection, controlled loading was encouraged. There is a balance to be achieved between excessive load, which can result in structural failure, and sub physiological underload, which has been proposed could cause suboptimal tissue quality (Dye, 2005, pp. 100–110). Consequently, a protection and progressive weightbearing and protection protocol was agreed with the surgeon to facilitate a gradual exposure of load to the bone-ligament interface during the early healing phase (Fig. 1). An Aircast boot (ACB) was worn until week five. The boot held the talocrural joint in a greater degree of dorsiflexion, thus controlling strain on the ATFL from anterior talar translation during the gait cycle. In addition, ankle positions that expose the lateral

	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6
Weight bearing status	NWB		PWB	FWB		
Protection	Plaster of Paris		AirCast Boot		Ankle brace	Ankle strapping
Ankle range restrictions	None		No plantar flexion or inversion		No end range inversion in plantar flexion	

Fig. 1. Weightbearing and protection protocol.

ligament complex to strain were progressively reintroduced from week two until week six (Fig. 1).

3.2. Two weeks post-surgery: restricted loading phase

Takeuchi et al. (2021) demonstrated that the ATFL is maximally strained in inverted positions, with strain increasing linearly with plantar flexion angle. Peak ATFL strain was identified between 20° and 30° PF. Therefore, to avoid excessive strain through the reconstruction, hindfoot inversion was avoided and exercises were restricted to outer and mid-range ankle positions until six-weeks post-surgically.

During the initial period of protected weight-bearing, the player experienced lower-limb muscle atrophy with a 2.5 cm difference between mid-belly calf circumference compared to contralateral limb following plaster removal. Consequently, blood-flow restriction training (BFRT) was utilised at week three post-surgically, to provide a hypoxic metabolic stimulus at lower loads to drive hypertrophic adaptation (Hughes et al., 2017).

The soleus contributes to the force closure of the tibiofibular joint, talocrural and subtalar joints, providing active stability during the gait cycle which may reduce the risk of future LAS (Agur et al., 2003; McKeon & Hoch, 2019). Furthermore, the calf complex plays a critical role in running, with Dorn et al. (2012) demonstrating forces between three and eight-times body weight (BW), produced by gastrocnemius and soleus respectively, at speeds less than 7 m.s-1. Therefore, it was important that physiological cross-sectional area of the tissue was targeted and measured to ensure the plantar flexors could produce large forces (Lieber & Friden, 2000). It is important to note, the model used by Dorn et al. (2012) did not account for individual differences in architectural features (achilles tendon moment arms, achilles tendon compliance and muscle fascicle length) which influence the mechanical demand on the soleus and gastrocnemius (Lee & Piazza, 2009; Lichtwark & Barclay, 2010). Therefore, it was important the MDT considered the player's pre-injury normative data and physical characteristics when determining achievable targets for outcome measures assessing plantar flexor function. To assess plantar flexor peak force, a seated mid-range calf raise was performed isometrically on a force platform at 90° knee-flexion from two weeks post-surgery. This has been shown to provide a reliable and valid measurement of plantar flexor isometric strength (Mattiussi et al., 2022; O'Neil et al., 2023). This test was completed at plantar grade to limit strain on the reconstruction. Data was calculated as force in kilogram (kg) as a multiple of BW and collected weekly during the rehabilitation process (Fig. 2). A peak force of greater than 1.6 times BW was considered to be an appropriate target for this player based on his normative scores and clinicians previous experience.

3.3. Five weeks post-surgery: progressive loading phase

The player started 50% BW running on the Alter-G treadmill at five weeks post-surgery. Linear running at reduced BW was clinically reasoned to be safe due to the comparative vertical ground reaction force (vGRF) of fast walking on land (Thomson et al., 2016) and thus complimented the weightbearing and protection protocol (Fig. 1). Alter-G running was progressed through manipulating speed and BW (van den Bekerom et al., 2013).

Following the removal of the ACB at five weeks post-surgery, interventions to improve ankle dorsiflexion range were targeted to prevent compensatory midfoot movement which would place increased stress on the reconstruction (Hughes, 1985). Furthermore, as the tibia comes across the talus during dorsiflexion, the stretch exerted upon the non-contractile tissue around the foot and ankle returns elastic energy which is transferred to assist in elevating the heel in toe-off. It could therefore be theorised that a loss of ankle dorsiflexion could cause increased kinetic demand within the system.

It is well recognised that CAI exists in athletes that have had recurrent LAS, therefore it is important that these deficits are addressed during the rehabilitation process. Within the literature, there is particular focus on isolated peroneal exercises to treat CAI, as the peroneals oppose ankle inversion moments (Kaminski & Hartsell, 2002). With reference to the ankle range restriction in Fig. 1, isolated peroneal loading using a theraband was prescribed once the plaster was removed. This provided progressive loading upon the bone to ligament interface whilst also providing a stimulus to the peroneal muscles. Peroneus longus and brevis have a plantar flexion and eversion moment (Bellew et al., 2010) so once the player was able to weight bear it was clinically reasoned that adequate stimulus of peroneals would be achieved through closed-chain calf loading. It is argued that there is insufficient time available for the peroneal muscles to produce sufficient force to oppose inversion moments (Hertel, 2002). Therefore, retraining joint-position sense through proprioceptive training was also included to target stability deficits.

Calf loading was progressed selecting exercises to gradually increase tensile load (Baxter et al., 2020) and plyometrics were progressed by gradually increasing the rate and magnitude of force. In addition to the calf's role in running, peak plantar flexor moments are associated with increased change of direction speed (Marshall et al., 2014). As a result, restoration of calf function was deemed a priority to prepare the calf for the imminent progression to football specific rehabilitation sessions.

As described by Dorn et al. (2012), at speeds below 7 m.s-1, an increase in running speed is achieved by the action of the plantar flexor's increasing stride-length. At speeds greater than 7 m.s-1, the briefer contact time lessens the plantar flexor's ability to produce force. Consequently, increasing stride frequency is necessary to progress running speed greater than 7 m.s-1. Increased stride frequency is achieved through the action of the hip flexors and extensors. Therefore, gym-based sessions began to emphasise the role of these muscle groups and prepared the athlete for the demands of running at speeds greater than 7 m.s-1 which would start in the next phase of rehabilitation.

3.4. Seven weeks post-surgery: preparation for training

In the seventh week the player had completed running at 100% BW on the AGT and consequently commenced straight-line running

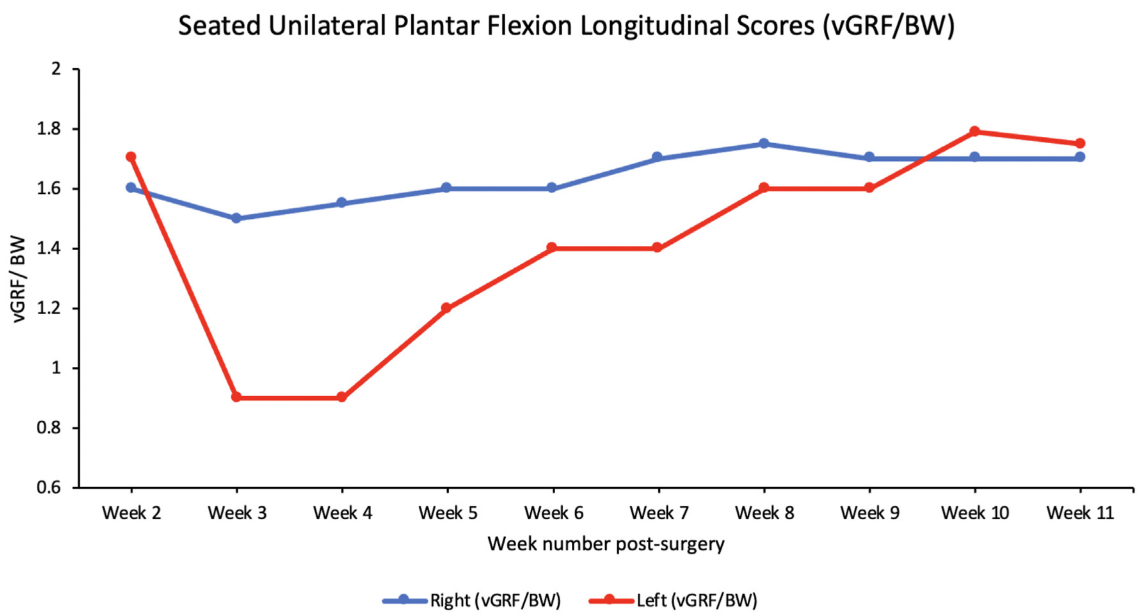

Fig. 2. Seated unilateral plantar flexion isometric force monitoring from week 2 to week 11 post-surgery displayed as vertical ground reaction force (vGRF) in kilogram (kg) as a multiple of body weight (BW).

on the pitch. As previously discussed, there is considerable demand on the soleus at all running speeds however, at faster speeds there is shorter ground contact-time, resulting in a lesser plantar flexion impulse (Dorn et al., 2012). Consequently, to protect the soleus, which had atrophied due to the weightbearing and protection protocol, pitch-rehabilitation started at moderate running speed (4–6 m.s-1.)

From straight-line running, pitch-based rehabilitation progressed to football-specific tasks. Change of direction (COD) was deemed the most vital action to be introduced gradually, due to the involved demands placed on the foot and ankle complex (Marshall et al., 2014) and the superior number of COD actions that a central midfielder completes in comparison to the positions (Dos'Santos et al., 2022). The kinetic and kinematic demands placed on the lower-limb during COD tasks increases with the angle of cut and entry-velocity (Dos'Santos et al., 2018), as a result these variables were progressed gradually.

Other technical actions were progressed utilising the Control to Chaos continuum developed by Taberner et al. (2019) (Fig. 3). Using pre-injury global positioning system (GPS), key physical metrics were extracted to understand the daily and weekly demands of training. The technical actions and physical outputs from week six to eleven are shown in Figs. 3 and 4.

Despite significant effort to replicate the cognitive demands of training during pitch-rehabilitation sessions, it is often difficult to mirror the chaos of team-training. Therefore, it was reasoned to progress the daily and weekly physical demands of pitch rehabilitation sessions beyond the daily and weekly worst-case demands of training (Fig. 4), so that although the reintroduction to training would be a cognitive progression, it would be a physical regression.

3.5. *Eleven weeks post-surgery: preparation for match-play*

By week eleven the player had been exposed to all necessary technical actions in both controlled and chaotic environments. Furthermore, key physical metrics had been progressed over a four-week period to build the player's chronic load (Fig. 4). Using average training and match data alone may underprepare the player for the higher intensity periods of training and match play (Riboli et al., 2021). Therefore, the most intense 1-min periods, measured by the physical metrics shown in Fig. 4, were retrieved from the previous six months of training and match play. This data was then used to prescribe pitch-rehabilitation drills that mirrored the intensity that would be expected upon return to training (RTT) and return to match play.

Throughout the later phases of rehabilitation, pitch and gym sessions were scheduled to mirror a normal training week. The MDT utilised pre-training preparation time together with strength and conditioning sessions to continue assessing the objective measures detailed in Fig. 5. This ensured that physical qualities and impairments targeted to mitigate the risk of re-injury were maintained and the player's physiological response to reloading were monitored.

4. Discussion

Very little research has been published to guide clinicians on how to optimally rehabilitate elite athletes or footballers following a lateral ankle ligament reconstruction. Timeframes for return to sport vary (Hong & Calder, 2022; Hunt et al., 2017; Pearce et al., 2016) and longer recovery times seem to be associated with concomitant injuries and complications following surgery, whilst similar timeframes seem to exist between very different sports (Hong & Calder, 2022). Individual circumstances and patient autonomy always require an athlete to be informed on their choices, but the content and structure of a rehabilitation programme, in the absence of evidence, must always be reasoned, dynamic, safe, and tailored to the athlete (Weiler et al., 2015).

Given this was the third recurrence of an injury, the primary aim of the rehabilitation process was to prevent reinjury or a secondary injury on return to sport. Therefore, it was paramount that rehabilitation was progressed according to the player's individual

Technical actions	Control to chaos stage	Tackling	Change of direction		Ball striking
			Angle of cut	Entry velocity (deceleration speed)	
Week 7	HIGH CONTROL	None	0-45d - planned	<5m.s-1	None
Week 8	CONTROL TO CHAOS	Gym Tackle Prep	> 90d - reactive	3-5m.s-1	Low intensity
			>45d - planned	<3m.s-1	
Week 9	MODERATE CHAOS	Controlled block tackling	> 90d - reactive	<3m.s-1	Moderate intensity
Week 10	HIGH CHAOS	Uncontrolled block tackles	Unrestricted	Unrestricted	High intensity
Abbreviations: d = degree, m.s-1 = metres per second					

Fig. 3. Control to Chaos continuum: week five to week eleven post-surgery.

	Normal Weekly Metrics		Week 5		Week 6		Week 7		Week 8		Week 9		Week 10	
Setting	Normal training involvement		Anti Gravity Treadmill 50-75%		Anti Gravity Treadmill 75-95%		Pitch rehabilitation		Pitch rehabilitation		Pitch rehabilitation		Pitch rehabilitation	
Physical metric	Weekly volume	% of pre-injury weekly volume	Weekly volume	% of pre-injury weekly volume	Weekly volume	% of pre-injury weekly volume	Weekly volume	% of pre-injury weekly volume	Weekly volume	% of pre-injury weekly volume	Weekly volume	% of pre-injury weekly volume	Weekly volume	% of pre-injury weekly volume
Weekly sessions	4-5	N/A	3	N/A	4	N/A	3	N/A	4	N/A	5	N/A	5	N/A
Total distance (m)	30,000	100%	8,000	N/A	10,000	N/A	14,000	47%	22,000	73%	28,000	93%	32,000	107%
High speed running (m)	2000	100%	0	N/A	200	N/A	1,000	50%	1,500	75%	2,000	100%	2,200	110%
Accelerations (<3m.s-1)	120	100%	0	N/A	0	N/A	60	50%	80	67%	120	100%	140	117%
Decelerations (<3m.s-1)	150	100%	0	N/A	0	N/A	80	53%	110	73%	150	100%	170	113%
Sprint distance (m)	800	100%	0	N/A	0	N/A	100	13%	400	50%	800	100%	1000	125%
Speed exposure (% max velocity)	95%+	N/A	40%	N/A	60%	N/A	80%	N/A	90%	N/A	95%+	N/A	95%+	N/A
Abbreviations: m = metres, m.s-1 = metres per second														

Fig. 4. Weekly physical (GPS) progressions from week five to week eleven post-surgery.

response to each specific intervention, as opposed to solely progressing the player in relation to time. Successful rehabilitation was achieved by detailed daily monitoring of swelling, range of movement and pain pre- and post-rehabilitation sessions. If these markers regressed, rehabilitation content was discussed by the MDT prior to the next session and adapted accordingly.

There was pressure on the MDT from the player to RTT in the shortest possible timeframe creating a challenging dichotomy in achieving both a safe and quick return to sport. The surgeon estimated the player would be able to RTT in 11–12 weeks post-surgery. In the absence of evidence discussing rehabilitation within these timeframes, the MDT were required to use information from case reports in alternative populations, studies discussing non-surgical management of LAS alongside the MDT's previous experiences, to deliver both a safe and quick RTT. Although case-reports rank low in the hierarchy of evidence, this case report provides a much-needed starting point to trigger further debate around best-practice, rehabilitation processes and research direction on this topic.

The player returned to full training at eleven weeks with no episodes of pain or instability up to the point that this case report was written. There is great variation across the definition of ‘return to sport’ within orthopaedic surgery literature, with criteria for ‘return to sport’ being limited as solely completing training sessions (Doege et al., 2021). This lack of standardisation can result in inaccurate comparisons and difficulty managing player expectations. Therefore, when discussing timeframes with player it was important the surgeon and MDT acknowledged the time it takes between the player returning to training and achieving the physical and mental readiness to compete in a professional football match.

It is important to note certain factors which enabled RTT in eleven weeks, which may not be available in all environments and cases. Firstly, the MDT had the resources to spend up to 6 h per day with the player, which allowed for daily progressions/regressions to optimise tissue adaptation. Furthermore, the MDT had access to gold-standard testing-equipment, which enabled the assessment of physical qualities deemed important to mitigate the increased risk that is associated with an accelerated return to sport. Finally, this player had no associated injuries or post-surgical complications, which commonly co-exist with LAS, that would complicate the return to sport process (Wijnhoud et al., 2022).

PHASE		OUTCOME MEASURE	
Phase 1	Protection	Time based - protection and weightbearing protocol (Figure 1)	
Phase 2	Restricted loading	Range of motion	• Half kneeling knee to wall test (cm) • Star excursion balance tool (cm)
		Muscle function	• Seated unilateral PF FP (vGRF/BW) • Supine ankle inversion HHD (N/Kg)
		Neuromuscular	• Single-leg balance with eyes shut (s) • Single-leg balance on unstable surface (s)
Phase 3	Progressive loading	Range of motion	• Half kneeling knee to wall test (cm) • Start excursion balance tool (cm)
		Muscle function	• Seated unilateral PF FP (vGRF/BW)
			• Supine ankle inversion HHD (N/Kg)
			• Supine ankle DF HHD (N/Kg)
			• Supine ankle eversion HHD (N/Kg)
		Neuromuscular	• Bilateral CMJ FP: RSI_mod; JH (cm); TTO (s); Peak landing force (N) • Bilateral drop landing FP TTS (s)
Phase 4	Preparation for training	Range of motion	• Half kneeling knee to wall test (cm) • Star excursion balance tool (cm)
		Muscle function	• Seated unilateral PF FP (vGRF/BW)
			• Standing unilateral PF FP (vGRF/BW)
			• Standing unilateral squat test FP (vGRF/BW)
			• Supine ankle DF HHD (N/Kg)
			• Supine ankle eversion HHD (N/Kg)
		Neuromuscular	• Single-leg CMJ FP: RSI_mod; JH (cm); TTO (s); Peak landing force (N) • Bilateral 10/5 RJT FP: RSI; JH (cm); Ground contact time (s) • Single-leg drop landing FP TTS (s)
		GPS	• Daily and weekly training GPS data surpassed
Phase 5	Preparation for match-play	Range of motion	• Phase 3 and 4 range of motion, muscle function and neuromuscular outcome measures assessed on a weekly basis during pre-training preparation time and strength and condiitoning sessions
		Muscle function	
		Neuromuscular	
		GPS	• Match-play GPS data surpassed

Abbreviations: cm = centimetres, FP = force platforms, HHD = handheld dynamometer, vGRF = vertical ground reactin force, BW = bodyweight, s = seconds, TTTO = time to take off, N = newtons, RSI_mod = reactive strength index modified, RSI = reactive strength index, JH = jump height, PF = plantarflexion, DF = dorsiflexion, CMJ = countermovement jump, RJT = repeated jump test, Time to stabilisation = TTS, Global positioning system = GPS

Fig. 5. A figure displaying exit criteria for each phase of rehabilitation.

5. Conclusion

LAS are injuries common to football players which can lead to recurrent injury, CAI and an extended absence from sport. To accurately determine the extent of the injury within a sporting population, a delayed clinical examination combined with MRI investigation is recommended. Whilst some high-grade LAS can be managed conservatively, surgical reconstruction is a viable approach in professional athletes, leading to excellent results within similar timeframes if the rehabilitation process encompasses player compliance, MDT collaboration and carefully considered clinical reasoning throughout.

Ethical approval was not required for this case study

The football player discussed in this case report gave consent for his rehabilitation to be discussed. Player anonymity is maintained throughout the case report.

Ethical approval

None declared.

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Declaration of competing interest

The authors (IL, LT and RW) declare no conflict of interests.

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