`

The effect of rehabilitation exercises on ankle instability in non-professional footballers

By Mandy Le Messurier

A dissertation submitted in partial fulfilment of the requirements of the Jing Advanced Massage Training Institute, for the Professional Diploma in Advanced Clinical Massage and Sports Massage (BTEC level 6)

March 2024

Total word count: 4125

"I certify that this work has not been accepted in substance for any degree and is not concurrently being submitted for any degree other than that of the Diploma in Advanced Clinical Massage and Sports Massage being studied at Jing institute of Advanced Massage Training and Complementary Medicine. I also declare that this work is the result of my own investigations except where otherwise identified by references and that I have not plagiarised the work of others".

Mrs M Le Messurier: 

Date: 31/03/2024

ACKNOWLDEGEMENTS

Firstly, I would like to acknowledge my boys. Their long suffering and patience due to my abandonment of them over the 20yrs with Jing, but primarily the last 2yrs which have been quite a journey. I couldn't have hoped for a better and more understanding husband and son. Let's not forget the Dogs…

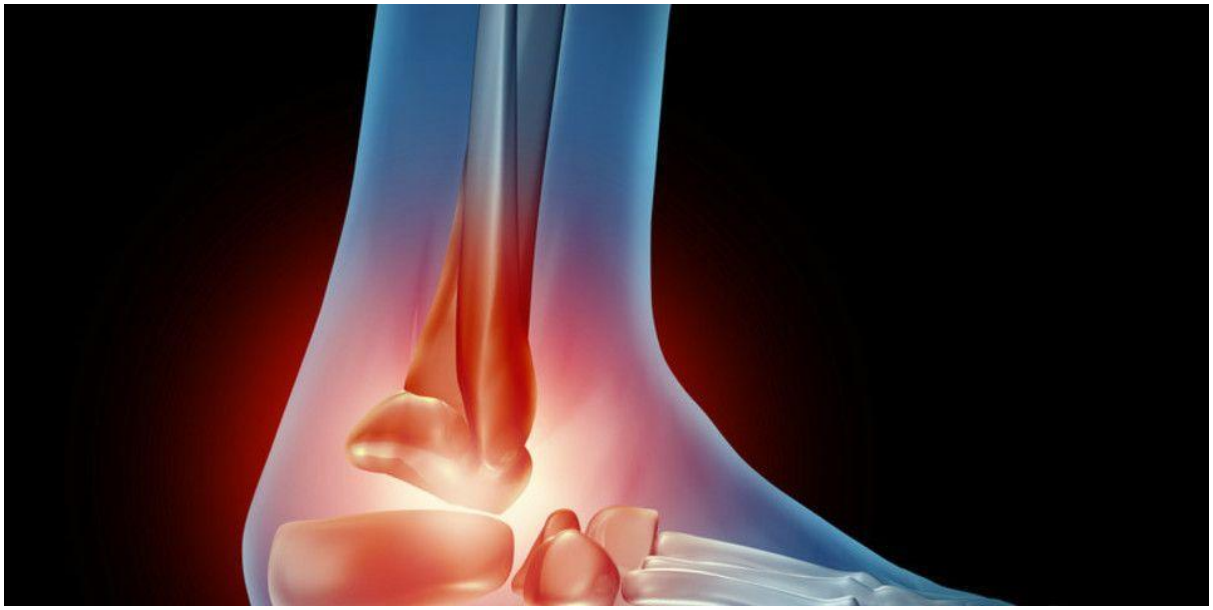
To my IT guru, aka Hubs, you are the best and incredibly patient.

Thank you to my mentors at Jing, and especially Susan for taking me under her wing and guiding me with her extensive knowledge on all things dissertations. I know I would not have completed this without your help.

Meg and Rachel, you have made Jing Institute a mecca and home for massage training and understanding for over 20yrs. You have had my massage heart and soul for 20yrs, my clients appreciate that, but most of all, I really appreciate that.

To the participants and all the footballers who have me going on at them to do their rehab exercises, this is also for you. Do as you are told..... it works!

And finally, to my fellow students. You have made me laugh, cry, throw toys out of the pram, but you have also been there. Thank you.



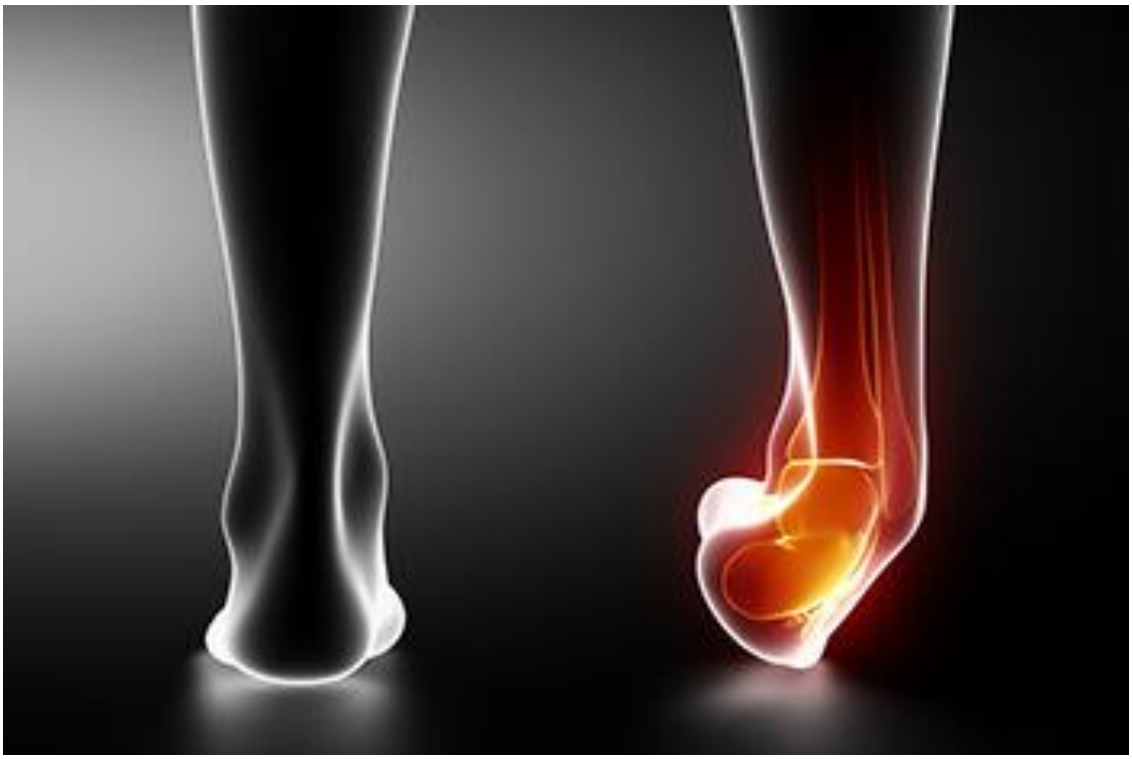


TABLE OF CONTENTS

ABBREVIATIONS AND MEANINGS

mSEBT	Star Excursion Balance Test
YBT	Y Balance Test
FADI	Functional Ankle Instability Index
FA	Football Association
ROM	Range of Motion
AROM	Active Range of Motion
CAI	Chronic Ankle Instability
WBLT	Weight Bearing Lunge Test

ABSTRACT

Objective: Lateral ankle sprains are one of the most common injuries amongst participants in sports such as football. This study aims to demonstrate the benefits of a prehabilitation exercises programme in non-professional footballers, showing that by strengthening their ankles, and improving dorsiflexion, that it could reduce the longevity spent in rehabilitation for non-impact ankle injuries.

Method: The demographic for the study was an adult, all female, non-professional football team and all participants were 18yrs or over. The questionnaire information was completed using the Functional Ankle Disability Index (FADI) which was completed once a week during the 12 weeks of the study. The grading of the FADI score was along a 5-point scale with 4 indicating no difficulty and 0 indicating full pain and instability. The Y Balance Test (YBT) score was completed on weeks 1 and 12 of the study which recorded the anterior, posteromedial, and posterolateral measurements of both ankles.

Results: The data collected from the respondent's indicated improvement in ankle stability in all directions of motion, as well as improved dorsiflexion which was recorded on weeks 1 and 12 of the study, using the YBT.

Conclusion: Within this study, rehabilitation exercises have shown to be supportive and beneficial in promoting ankle stability within non-professional footballers, this was seen when used with the prehabilitation exercises programme. However further research is required with a larger group of participants and funding for this research is also required to benefit all sporting modalities, physiotherapists and clinical massage therapists.

INTRODUCTION

Ankle sprains can cause stiffness and abnormalities in gait, pain, and stiffness in around 72% of individuals in the general population (Walters and Cordoza, 2023: 445-446). According to Walters and Cordoza (2023) there is around an 80% chance of re occurrence of the ankle injury. The specific aggravating factors after an ankle sprain are through all ranges of movement including walking or running on uneven surfaces. Most of these sprains require a rehabilitation programme and this needs to consist of improving stability, mobility, and strength.

Ankle injuries can "typically heal within 4-16 weeks depending on the severity and how quickly you can implement an appropriate rehab programme" (Walters and Cordoza, 2023: 446). Lateral ankle injuries are incredibly common within professional and non-professional football which in turn can have financial consequences for not only the players involved but also their club. Additionally, this could impact some of the players who have international duties, meaning injuries could cause them to miss out on playing for their country (Clark and Campbell, 2021; Walden et al, 2013). Within the Walters and Cordoza study, recommendations were made to promote preventative measures including sufficient treatment and full rehabilitation of injuries. They also suggested appropriate exercises and warmups with continual education on the biomechanics of injuries. In order to have a comparison and not single out injured players, the exercises were provided to the whole team and not just those who sustained ankle injuries (Walters and Cordoza, 2023).

Within English football specifically, ankle injuries accounted for 17% injuries suffered by professional players (Clark and Campbell, 2021; Ekstrand et al, 2011; Walden et al, 2013) and a 2-year study completed in 2007 by Kofotolis et al also recognised how common ankle sprains were within football (Kofotolis et al, 2007). The study by Kofotolis et al looked at the risk

factors in amateur players, who had no other income other than the own professional or manual jobs. The purpose of their study was also to identify the incidence of ankle sprain injuries associated with time lost in participation, and the risk factors during two consecutive seasons, within the amateur game, it was concluded that approximately 208 ankle injuries were recorded, with 139 of these being ankle sprains. It also found 975 football sessions were lost during this period, and injuries were the primary cause of ankle damage, most notably these were seen in defenders during practice as well as games, with a higher rate of injury appearing at the end of the game (Kofotolis et al, 2007). The study by Kekelekis et al, who collected data from Greek amateur footballers from 6 teams during the 2018/2019 season, found that that amateur clubs would benefit from injury prevention strategies incorporated into their regular training practice (Kekelekis et al, 2023).

In 2003, Woods completed a study through the Football Association (FA) medical research programme. The results compiled records of injuries over two consecutive seasons, where ankle ligament sprains accounted for 11% of the total injuries over the 2 seasons, with over 77% of sprains involving the lateral ligament complex. It was also noted that 12,138 days were missed due to ankle sprain injuries, and 2,033 football matches were missing players during this period due to injured players. 54% of ankle sprains were observed during tackles within matches and there is also a recurrence rate of injury in around 9% of players. The conclusion to this study indicated that 'ankle ligament sprains are common in football, usually involving the lateral ligament complex' (Woods et al, 2023: 233). The high rate of occurrence or reoccurrence indicates that prevention is of paramount importance. With the most common injury being ankle sprains reaching 77%, the take home message to the reader from this study is that 'preventative strategies along with effective rehabilitation and preseason conditioning

of the ankle' is paramount, as well as educating the coaching staff and fellow players (Woods et al, 2023: 237).

A study from the FA academies indicated a mean incidence of 20 training days missed as well as 2 matches, in players who had an ankle injury per year. The prolonged loss of the training time caused by these injuries has far reaching implications, both on and off the field (Cloke et al, 2008). This study's demographic was with footballers under the age of 18. There is no direction in this study as to whether the young players were given rehab programmes or taught self-care during their time away from training. From the research in the paper so far, the incidence of ankle instability due to injury has a massive impact not only on the player but also playing time within the club. The aim of the study by Cruz et al was to determine the extent of ankle instability within regional leagues as well as looking at the extrinsic factors that affect ankle instability. Up to 3 training sessions, as well as an actual match, were reviewed and it was felt that there was a need for more technical training leaving aside an adequate warm-up or stretching periods when considering minor leagues (Cruz et al, 2020).

One major limitation identified, which affects all football in the UK which can be due to the adverse weather conditions, is that the surface playing environment would variably change from grass pitches to artificial turf, and that could provide an extrinsic situation that can lead to ankle instability or injury (Bairner, 2019). Gould et al was able to show that the body of literature relating to artificial versus grass surfaces determined ankle and foot injuries were higher on both the old and new generation artificial turf compared to those sustained on natural grass (Gould et al, 2023). A further limitation indicated that it was difficult to show if any of the players with ankle injuries/instability completed a rehabilitation programme. Cruz et al suggests that a database of objective measures such as inflammatory signs, pain and functional

tests, defining the relationship between different factors and associations, would create an essential instrument to the training methodological guidance and injury prevention and would also be a valuable source of information to the development of studies. With further studies focusing on the different rehabilitation strategies, human and material resources, and analysing what role these factors play in the development of chronic ankle instability, progress can be made in developing prehabilitation programmes for all amateur football clubs in the UK (Cruz et al, 2020).

Within non-professional football you will generally find that there is less likely to be a specialised team within their club with a nutritionist, doctor, physiotherapist, or sports therapist (Cruz, 2020). Most of the back-room staff are volunteers who give up their time to support the club with very few being paid professionals. When players are injured, they sit out for a specific period until they can play again, and recovery is also dependent on their chosen profession. A bad tackle resulting in a severe ankle strain can result in professions that rely on physical labour such as a decorator, builder, gardener, scaffolder, to name a few physical professions, losing out financially by being unable to work. This study aims to investigate how to support the non-professional footballer to continue to play the sport they love without taking excessive time off work and reduce their time away from play.

According to Walters and Cordoza rehabilitation exercises are mistakenly thought to be used only in the case of injury. Building up strength and mobility within all ranges of motion (ROM), in all joints, helps to make the body more resilient and can help to prevent a problem from reoccurring (Walters and Cordoza, 2023: p). Prehabilitation programmes can also aid in highlighting red flags that may have been missed until injury, such as unrelenting night pain, paraesthesia, recent trauma, or infection. In the study by Mros and Dawes (2019) firefighters

were given a prehabilitation programme to help strengthen their shoulder joint and decrease the risk of injuries, which can occur frequently due to the nature and demands of their job. Mros and Dawes were able to show that the programme specifically for the firefighters could help to improve the structures of the shoulder, by improving muscular endurance and as a result, able to reduce the risk of injury (Mros and Dawes, 2019). It stands to reason that a similar programme of prehabilitation exercises could help to reduce the risk of a non-impact ankle injury in footballers, as well as other sports, where ankle instability and sprains are prevalent.

TESTING

Plisky et al (2006) used the Star Excursion Balance Test (mSEBT) as a measuring tool to determine whether ankle reach distance was associated with the risk of injury to the lower extremity. The researchers reviewed other studies and found that although balance has been proposed as a risk factor to injury, few researchers have used a dynamic balance test to examine whether this relationship is correct (Plisky et al, 2006). It was noted that researchers indicated effectiveness of neuromuscular training programmes to decrease risk of lower extremity injury in athletes and found that balance could be improved after 6-7 weeks of training. The study goes on to suggest that any further studies should investigate if mSEBT reach distance improves after completing neuromuscular training programmes (Plisky et al, 2006).

In the updated review of the practical guidelines of SEBT some of the key points were that the modified mSEBT should be used and seen as a reliable clinical tool to assess dynamic postural control, and that procedure consistency is needed (Picot et al, 2020). Cook and Pilsky felt that an efficient test backed by research was needed to identify those who would lose time away from their sport (Cook and Pilsky, 2015). The guidelines found that evidence indicated that

ankle dorsiflexion accounts for a significant proportion of anterior direction (Cook and Pilsky, 2015), and Cejudo et al found that ankle dorsiflexion measurements from the new version of the Weight Bearing Lunge Test (WBLT), has excellent reliability scores (Cejudo et al, 2014). The report by Picot et al agreed with Cejudo et al and found that a reduced ROM is a significant risk factor for ankle sprains and suggested that cut off scores are required for assessing at risk athletes for ankle injuries as well as a return to sport (Picot et al, 2020; Cejudo et al, 2014).

Cook and Pilsky (2015) found that the mSEBT had 8 reach directions which did not allow for the testing to be time efficient, and that through their research, 3 directions gave sufficient information in the shortest time period, thus being far more efficient in measuring stability in the client. Based on the information above, this current study on ankle rehabilitation utilised the Y Balance Test (YBT) to assess ROM and a rehabilitation programme incorporating a variety of exercises to strengthen ROM was devised by the researcher.

ASSESSMENT

An 11 year study by Walden et al found that although ankle injuries within football are common, the circumstances surrounding them are not well characterised (Walden et al, 2013). The results from their study found a total of 13% of all injuries were related to the ankle and that 51% of those injuries were associated with lateral ankle sprain. In conclusion the researchers found that lateral ligament ankle sprain constituted half of all of the ankle injuries within male professional football. As indicated earlier, there is a financial incentive to ensure the injured professional football player returns to training and regains match fitness. Professional footballers often play and work their way up through grass roots football. They

attend their local clubs, play for their school, and then hopefully get spotted by scouts in order to be contracted to play for a more superior, mainly professional, club.

As described in Fairweather and Mari (2015: 58) an educated evaluation of a client's condition and physical basis for his/her symptoms is essential in order to determine a course of treatment. Taking into consideration that the biopsychosocial model of therapy is not only good practice for a therapist, but it also provides far more insight into the client and how any treatment and, importantly, rehabilitation programme will progress. The Functional Ankle Instability Index (FADI) is an all-round assessment questionnaire with a measurable score, to indicate ankle instability and overall wellbeing and physical health. FADI has been considered a reliable and sensitive, patient-assessed tool to quantify functional disability in patients with chronic ankle instability (Leigheb et al, 2020).

The FADI contains 22 questions relating to Activities of Daily Living (ADL) to be scored from 0 to 4, 4 being no pain or instability with 0 indicating full dysfunction. 8 questions are asked in the sports module, and 4 questions specifically relate to foot and ankle pain, also scored 0 to 4 (appendix 5). The combined score from the 3 sections totals 136, which indicates that there is no ankle disability. This is a score that the client can work towards using prehab exercises if not injured and indicate their progression from injury and treatment to the ankle. This questionnaire appeared to be a reliable tool in assessing and measuring chronic ankle instability (CAI) which is sensitive to differences between healthy subjects and subjects with CAI, and responsive to improvements in function after rehab in subjects with CAI (Hale and Hertel, 2005).

METHOD

The aim of this study was to recruit amateur footballers to assess ankle stability using the YBT and to determine whether a 12 week programme of exercises had a positive effect on the ankle. Ethical approval was received for the following study from the Jing Institute in 2023 (appendix 1).

Participants were recruited from a non-professional football team known to the researcher and were invited to take part as long as they were over 18yrs of age and were not presently receiving treatment for an ankle sprain or have pins/plates in their ankle. The study was explained to the participants and those willing to commit to the 12-week study signed the participant consent contract (appendix 3). This was a within subject design study and the intervention period began on week 7 and continued through to week 12. The FADI questionnaire was used throughout this period and returned to the researcher on Wednesday of each week before training.

A group WhatsApp message was sent on the Monday to remind all participants to complete their questionnaire and return, and again on the Tuesday, with follow up on the Wednesday (appendix 5). No other hands-on treatment or physiotherapy was taken during this time. Each player had their dorsiflexion and balance tested using the YBT on week 1 of the control section of the study (see appendix 4). During the 6-week intervention period, ankle mobility and strengthening exercises were given to all participants in the form of WhatsApp videos as well as a PDF containing all of the exercises with the number of sets and repetitions required and was sent to the group for each participant to print out and keep (appendix 6).

The intervention period began on week 7 and continued through to week 12 with ROM exercises to be completed every day, and the strengthening exercises to be completed 4 times

a week for the full duration left of the study. Active ROM exercises were completed daily to initially warm up the ankle and promote movement. These included the alphabet ankle sequence, which was to be completed daily, preferably in the morning. Dorsi and plantar flexion, inversion and eversion exercises, 1 set of 10 repetitions to each ankle, were set to complete also in the morning, and continued daily from week 7 to 12, with banded resisted exercises for dorsi, plantar, eversion and inversion movements added to be completed 4 times each week (appendix 7).

Although 10 participants were recruited for the study, there was a hight dropout rate and only 2 participants completed the full 12-week study. The remaining participants were re assessed using the YBT at week 12 and measurements were compared to that in week 1 at the start of the study.

RESULTS

FIGURE 1– FADI MEAN SCORE ADL

Activities of Daily Living	Week1	Week2	Week3	Week4	Week5	Week6	Week7	Week8	Week9	Week10	Week11	Week12
Participant 4	88	88	88	88	88	88	88	88	88	88	88	88
Participant 8	67	69	70	70	65	75	85	87	88	87	86	88
Mean FADI Score	77.5	78.5	79	79	76.5	81.5	86.5	87.5	88	87.5	87	88

Sports Module	Week1	Week2	Week3	Week4	Week5	Week6	Week7	Week8	Week9	Week10	Week11	Week12
Participant 4	32	31	32	32	32	32	32	32	32	32	32	32
Participant 8	19	18	19	19	19	25	28	29	29	32	31	32
Mean FADI Score	25.5	24.5	25.5	25.5	25.5	28.5	30	30.5	30.5	32	31.5	32

Foot & Ankle Pain	Week1	Week2	Week3	Week4	Week5	Week6	Week7	Week8	Week9	Week10	Week11	Week12
Participant 4	16	16	16	16	16	16	16	16	16	16	16	16
Participant 8	11	11	11	11	11	12	13	16	16	15	16	16
Mean FADI Score	13.5	13.5	13.5	13.5	13.5	14	14.5	16	16	15.5	16	16

FIGURE 2 ADL MEAN FADI SCORE

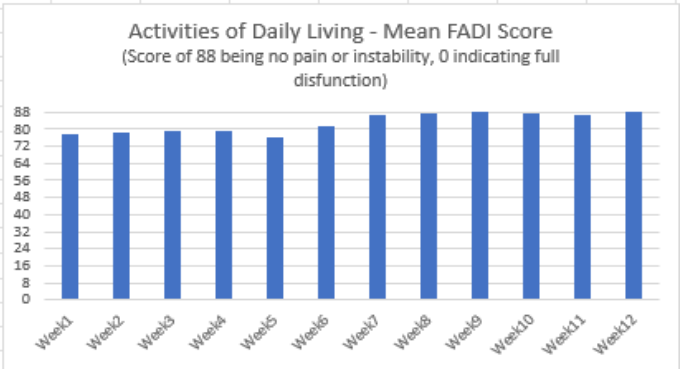


FIGURE 3 SPORTS MODULE MEAN FADI SCORE

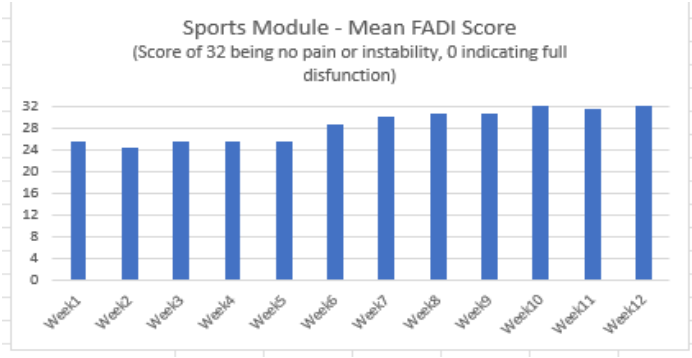


FIGURE 4 ANKLE PAIN MEAN FADI SCORE

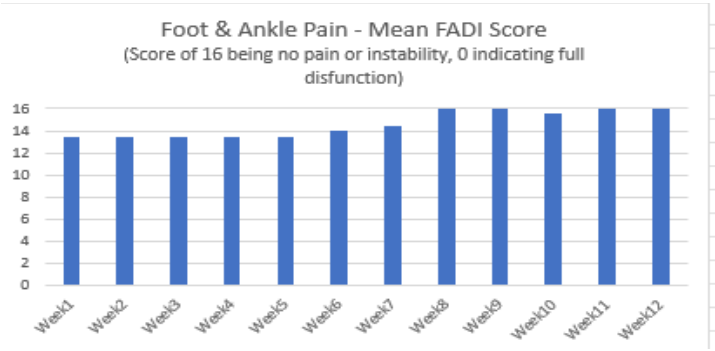
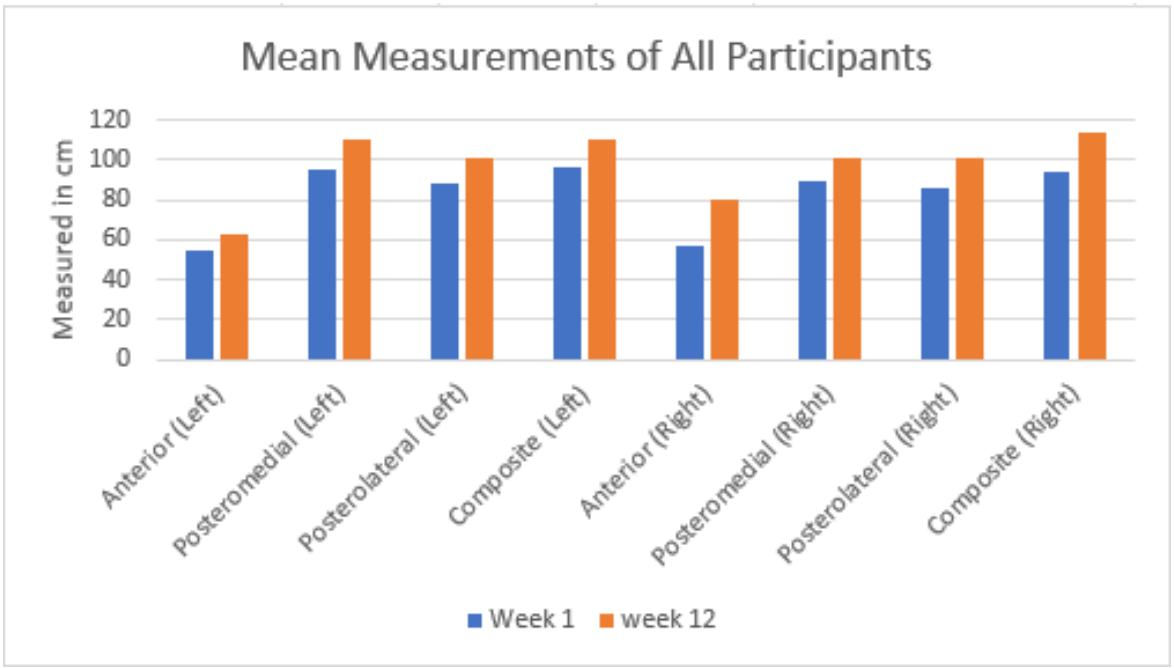


FIGURE 5 MEAN YBT SCORES WEEKS 1 AND 12

Participant 4	Week 1	week 12	Participant 8	Week 1	week 12	Mean of All Participants	Week 1	week 12
Anterior (Left)	58	62	Anterior (Left)	51	63	Anterior (Left)	55	63
Posteromedial (Left)	92	108	Posteromedial (Left)	98	112	Posteromedial (Left)	95	110
Posterolateral (Left)	90	100	Posterolateral (Left)	86	103	Posterolateral (Left)	88	102
Composite (Left)	95	107	Composite (Left)	97	114	Composite (Left)	96	111
Anterior (Right)	60	62	Anterior (Right)	55	99	Anterior (Right)	58	81
Posteromedial (Right)	92	102	Posteromedial (Right)	87	99	Posteromedial (Right)	90	101
Posterolateral (Right)	91	104	Posterolateral (Right)	81	98	Posterolateral (Right)	86	101
Composite (Right)	96	106	Composite (Right)	92	122	Composite (Right)	94	114

FIGURE 6 MEAN MEASUREMENTS OF ALL PARTICIPANTS



DISCUSSION

This study set out to assess the effectiveness of a rehabilitation programme on ankle instability in non-professional footballers. 10 participants were recruited at the beginning of the study, however due to noncompliance and injury only 2 participants were able to complete the 12-week programme, therefore there is insufficient data to make any generalisations about the efficacy of this study. Due to noncompliance and injury only 2 results have been recorded. These results have been correlated and displayed in the results section. The remaining participants completed the FADI questionnaire throughout the 12 weeks of the study and had the YBT test was scored on weeks 1 and 12.

FINDINGS

The mean data correlated from the FADI questionnaire indicates that participants showed improvement within all 3 sections, from intervention period weeks 7 - 12, with ankle/foot pain being reduced and ROM improved. The results from the YBT indicate a marked improvement in stability and ROM from both participants for their final measurement on week 12. This proves encouraging as it tends to corroborate the information presented by Walters and Cordoza (2023: 109) in which rehab used as prehab can increase ROM in joints which in turn can help to make them more resilient potentially also reducing the long-term likelihood of reinjury, with Picot et al (2021) also indicating increased ROM improved stability and decreased ankle injury.

A third participant was unable to complete the study due to suffering an ankle injury during training before week 10. Therefore, their scores for FADI and YBT have not been correlated within the data for this study. It prompts the question of what would the results be like if the

study was completed with a larger group of participants and whether it could be widened out to participants in other sports?

LESSONS LEARNT

The importance of the Therapeutic Alliance (TA) during a study is essential. Fairweather and Mari (2015) discuss TA as a key component of facilitating wellness in your client. This refers to the sense of collaboration, warmth and support between the client and therapist indicated by Sheppard (2018) who also found difficulties with motivation during his study, 'The variability of levels of motivation at base level created an unforeseen problem in delivery of the programme. The non-athletes, of which there were several, required a more direct form to teaching to meet the stated goal of achieving similar levels of comprehension and performance throughout the sample' (Sheppard 2018:19). Sheppard also suggested that future study is required as his programme indicated how positive TA was and improved the pain outcomes in his study participants. Leaving participants to complete rehab exercises at home were not conducive in a study by Essery et al (2016). It is apparent that TA within this study needed to improve to ensure compliance and that a more direct approach by the researcher may have been the change needed.

What this present study shows is that you cannot entirely rely on participants to fulfil their part in the programme even though they initially indicated that they would take part by signing a participation contract with the researcher (appendix 3). Although 10 participants signed up, only 3 took part in the full study, with one being unable to complete the 12 weeks study due to sustaining an injury during training. A much larger study group would be beneficial to continue this study in support of the non-professional footballers, as limiting the participants to the one team did not prove to be successful. Essery et al shows that for those who have home based

physical therapy rehab programmes, non-adherence can reach up to 70% (Essery et al, 2016). This is a significant amount of rehab that is not being completed and in turn this could cause further problems for the client down the line. As suggested by this, future studies may also benefit from closer monitoring of the participants and how thoroughly they complete their exercises, in order to avoid potentially skewed data.

As previously stated, prehabilitation has a place within physical therapy and massage therapy. Unfortunately, Physiotherapists are generally not sought out until an injury or illness happens. As highly qualified Massage Therapists, we have an important role in aiding our clients from every walk of life, to maintain their health and help to reduce further injury or illness. Widening the study demographic to incorporate more football clubs and possibly other sports such as hockey and softball, would provide a larger research group to fulfil the needs of this study to prove conclusively that prehabilitation is beneficial not only to the ankle, but all other joints. Heng (2021) supports research in this instance in relation to massage therapy in that 'research holds an important value in relation to massage therapy practices within their own discipline and within the wider context of massage therapy in the UK' (Heng, 2021: 2).

De Ruvo (2022) completed a literature search to determine if manual therapy, along with therapeutic exercise, could reduce the poor outcomes of patients with lateral ankle sprains. Out of the 3 randomised clinical trials reviewed, the meta-analysis revealed that manual therapy, along with exercise, was far more effective than exercise alone in improving dorsi and plantar flexion. As discussed in his blog, Shiekhy states that 'manual therapy techniques can help improve ROM and decrease pain to enable the patient to participate in rehab exercises more freely' (Shiekhy, 2024).

Initially hands-on weekly treatments were offered to each participant from week 7-12 using the Jing Method (Fairweather and Mari, 2015) where the Jing Method protocol of treating leg, knee, and foot pain, would have been applied to each participant weekly between each training session (Fairweather and Mari, 2015: 325-331, 334, 339-342). There was also noncompliance with this part of the study from the remaining participants, with lack of available spare time to attend for treatment being the main factor behind this part of the study not being completed. In hindsight, discussing in more detail the benefits of massage therapy and how it could impact the study as well as the participants' own wellbeing could have made a difference to the compliance in relation to hands on therapy and the overall study.

LIMITATIONS

Restricting the study to one specific team was not conducive to the research. Due to non-compliance, there was insufficient data to be recorded to show conclusively that a prehabilitation programme in relation to the ankle was beneficial in reducing pain and improving stability. An ankle injury can take anywhere from 1-3 weeks for a grade 1, up to 8 weeks for grade 2 and several months for full rupture at grade 3 in one study, and from 4 -16 weeks in another (Harvard Medical School, 2021; Walters and Cordoza, 2023).

Taking this into consideration, the intervention period was arguably insufficient in the length of time for this type of study, and in the researcher's opinion, further studies would benefit from a longer intervention and follow up period.

CONCLUSION

In conclusion, the results of this analysis suggest that the implementation of a prehabilitation exercise programme for non-professional footballers is beneficial in reducing ankle pain and increasing dorsiflexion and ankle stability. This benefits not only the individual player but also the club they represent. However, the researcher recognises that the low level of participants in this study reduces the statistical significance of the findings.

The FADI questionnaire proved to be beneficial from a therapist's point of view, being more aware of the biopsychosocial approach and how it helps their client in the long run and not just through injury (Leigheb et al, 2020). The YBT is an excellent tool to determine not only ankle dorsiflexion, but also knee stability, prompting even more study in other areas where joint instability or risk of injury occurs. This could be an informative tool for therapists to have in general, as it is a visual aid for clients which allows clients to see how far they are progressing in their treatment, as well as being applicable for use in the upper body (Hale and Hertel, 2005).

This study suggests important areas for exploration and further research and by utilising the above tools it would open areas of introducing prehabilitation into everyday training sessions with athletes, players and any of the clients who put their bodies and joints under strain, whether through sport or their profession. There is a growing body of evidence indicating that small scale studies in research support that clinical massage therapy is a valuable tool within this field (Birch, 2024; Fairweather and Mari, 2015). Working with the main sports bodies and/or sponsors of the sport, would provide the funding and collaboration to continue this research and contribute to the ongoing development of prehabilitation programmes and reduce the severity of ankle injuries within football and other sports.

REFERENCES

Bairner, R. (2019). *Do artificial football pitches cause more injuries than grass?* https://www.goal.com/en/news/do-artificial-football-pitches-cause-more-injuries-than-grass/1prtyjo6rv5jh13jpf7fvb0jfz

Birch, F. (2024). *Evaluating the Jing chronic stress protocol for wellbeing in women aged 40-60.* Jing Institute. Brighton

Cejudo, A. and Sainz de Baranda, P. and Ayala, F. and Santonja, F. (2014). *A simplified version of the weight-bearing ankle lunge test: description and test-retest reliability.* Manual Therapy, 19(4), 355–359.

Clark, Ni. and C. Campbell, S. D. (2021). *Preseason weight-bearing ankle dorsiflexion in male professional football players with and without a history of severe ankle injury: A novel analysis in an English Premier League Club*. Physical Therapy in Sport, *52*, 21–29.

Clocke, D. J. and Spencer, S. and Hodson, A. and Deehan, D. (2009). *The epidemiology of ankle in English Football Association academies*. British Journal of Sports Medicine, *43*, 1119–1125.

Cook, G. and Plisky. P. (2015) https://www.functionalmovement.com/files/Articles/660a_YBT%20Online%20Manual%20v1.pdf

Cruz, A. and Oliverira, R. (2020). *Functional Ankle Instability Prevalence and Associated Risk Factors in Male Football Players*. Open Journal of Orthopedics, *10*, 77–92.

De Ruvo, R and, Russo, G.and Lena, F. and Giovannico, G. and Neville, C. and Turolla, A. and Torre, M. and Pellicciari, L. (2022*). The Effect of Manual Therapy Plus Exercise in Patients with Lateral Ankle Sprains; A Critically Appraised Topic with a Meta-Analysis. Journal of Clinical Medicine, 11*(16).

Ekstrand, J. and Spreco, A and Bengstsson, H. and Bahr, R (2021) *Injury rates decreased in men's professional football: an 18-year prospective cohort study of almost 12000 injuries sustaind during 1.8 million hours of play.* https://bjsm.bmj.com/content/bjsports/early/2021/02/05/bjsports-2020-103159.full.pdf

Essery, R. and Geraghty, A. and Kirby, S. and Yardley, L. (2017) *Predictors of adherence to home-based physical therapies: a systematic review, Disability and Rehabilitation*, 39:6, 519-534, DOI: 10.3109/09638288.2016.1153160

Fairweather. R and Mari. M (2015*) Massage Fusion: The Jing Method for the treatment of chronic pain*. Handspring publishing, Scotland. ISBN 978-1-909141-23-0

Gould, HP. and Lostetter, SJ. and Samuelson, ER. and Guyton, GP. (2023). *Lower Extremity Rates on Artificial Turf versus Natural Grass Playing /surfaces: A Systematic Review*. Am j

Sports Med. May;51(6):1615-1621. Doi:10.1177/03635465211069562. Epub 2022 May 20. PMID: 35593739.

Hale, S. and Hertel, J. (2005). *Reliability and Sensitivity of the Foot and Ankle Disability Index in Subjects with Chronic Ankle Instability*. Journal of Athletic Training, *40*(1), 35–40.

Harvard Health Publishing. (2021, June 21). *Pain; Recovering from an ankle sprain.* Harvard Health Publishing.

Heng, N. (2021). *Use of Research, Research-based Resources and Perceptions on the Importance of research in UK Massage Therapists.* Jing Institute. Brighton

Kekelekis, A. and Kounali, Z. and Kofotolis, N. and Clemente, FM. and Kellis, E. *Epidemiology of Injuries in Amateur Male Soccer Players: A Prospective One-Year Study.* Healthcare (Basel). 2023 Jan 25;11(3):352. doi: 10.3390/healthcare11030352. PMID: 36766927; PMCID: PMC9914725.

Kofotolis, ND. and Kellis, E. and Vlachopoulos, SP. *Ankle sprain injuries and risk factors in amateur soccer players during a 2-year period.* Am J Sports Med. 2007 Mar;35(3):458-66. doi: 10.1177/0363546506294857. Epub 2007 Jan 11. PMID: 17218660.

Leigheb, M. and Rava, E. and Vaiuso, D. and Samaila, EM. and Pogliacomi, F. and Bosetti, M. and Grassi, FA. and Sabbatini, M. Translation, *Cross-cultural adaptation, reliability, and validation of the italian version of the Foot and Ankle Disability Index (FADI*). Acta Biomed. 2020 May 30;91(4-S):160-166. doi: 10.23750/abm.v91i4-S.9544. PMID: 32555091; PMCID: PMC7944815.

Mros, S. and Dawes, J. (2019) August, 3 (53) *Using suspension based resistance training as a method of shoulder prehabilitation for firefighters.* National Strength and Conditioning Association. https://www.nsca.com/education/articles/tsac-report/suspension-based-resistance-training-shoulder-prehabilitation-firefighters/

Picot, B. P. and Terrier, R. P. and Forestier, N. P. and Fourchet, F. P. P. and McKeon, P. O. P. A. C. (2021). *The Star Excursion Balance Test: An Update Review and Practical Guidelines.* International Journal of Athletics Therapy and Training, *26*, 285–293.

Plisky, PJ. and Rauh, MJ. and Kaminski, TW. and Underwood, FB. *Star Excursion Balance Test as a predictor of lower extremity injury in high school basketball players*. J Orthop Sports Phys Ther. 2006 Dec;36(12):911-9. doi: 10.2519/jospt.2006.2244. PMID: 17193868.

Sheppard, D. (2018). *Examining the effects of Therapeutic Alliance on pain outcomes when using different communication styles to teach and support participants through a core rehabilitation programme*. Jing Institute, Brighton.

Shiekhy, J Dr. (2024) *Ankle sprain solutions: an expert physiotherapist's strategies for success*. https://www.physio-network.com/blog/ankle-sprain-management/?utm_source=later&utm_medium=org&utm_campaign=ankle-sprain-management&utm_term=211223

Waldén, M. and Hägglund, M. and Ekstrand, J. *Time-trends and circumstances surrounding ankle injuries in men's professional football: an 11-year follow-up of the UEFA Champions League injury study*. Br J Sports Med. 2013 Aug;47(12):748-53. doi: 10.1136/bjsports-2013-092223. Epub 2013 Jun 27. PMID: 23813486.

Walters, T. and Cordoza, G. (2023). *Rehab Science. How to overcome pain and heal from injury*. (1st ed., Vol. 1). Victory Belt Publishing Inc.

Woods, C. and Hawkins, H. M. and Hodson, A. (2003). *The Football Association Medical Research Programme: an audit of injuries in professional football: an analysis of ankle sprains*. British Journal of Sports Medicine, *37*, 233–238.

BIBLIOGRAPHY

Finch, C. and Laine, A. M. and Godfrey, R. J. and Loosemore, M. and White, G. P. (2014). *Part 2: The predictive model: Providing solutions for events predicted to occur.* Case studies in sport science and medicine (pp. 115–119).

Gribble, P. and Delahunt, E. and Bleakley, C. (2014). *Selection criteria for patients with chronic ankle instability in controlled research: a position statement of the International Ankle Consortium.* British Journal of Sports Medicine, *48*, 1014–1018

Fujitaka, K. and Taniguchi, A. and Kumai, T. and Otuki, S. and Okubo, M. and Tanaka, Y. *Effect of Changes in Artificial Turf on Sports Injuries in Male University Soccer Players*. Orthopaedic Journal of Sports Medicine. 2017;5(8). doi:10.1177/2325967117719648

Hughes, M. (2017, June 2). *Ankle Sprains: not so simple*. Mick Hughes: Sports and Exercise Physiotherapist.

Kannus, P. and Kujala, U. And Parkkari, J. (2001*). Is it possible to prevent sports injuries?* Sports Medicine, *31*(14), 985–995.

Sarcon, A. K. M. and Heyrani, N. M. and Giza, E. M. and Kreulen, C. M. (2019). *Lateral Ankle Sprain and Chronic Ankle Instability*. Foot and Ankle Orthopaedics, *4*(2), 1–10.

Tik-Pui Fong, D. and Hong, Y. and Chan, L.-K. and Shu-Hang Yung, P. and Chan, K.-M. (2007). A Systematic Review on Ankle Injury and Ankle Sprain in *Sports. Sports Medicine*, *37*(1), 73–94.

Walls, R. and Ross, K. and Fraser, E. and Hodgkins, C. and Smith, N. and Egan, C. and Calder, J. and Kennedy, G. (2016*). Football injuries of the ankle_ A review of injury mechanisms, diagnosis and management* - PMC. World Journal of Orthopaedics, *18*(7), 8–19.

Walden, M. and Mountjoy, M. and McAll, A. and Serner, A. and Massey, A. and Tol, J. and Bahr, R. and D'Hooghe, M. and Bittencourt, N. and Della Villa, F.and Dohi, M. and Dupont, G. and Fulcher, M. and Van Rensburg, D. and Lu, D. and Anderson, T. (2022). *Football-specific extension of the IOC consensus statement: methods for recording and reporting epidemiological date on injury and illness in sport* 2020. British Journal of Sport medicine. 10.1136.

Wentao, M. (2023). *Problems and strategies for the prevention of ankle injuries in soccer*. Rev Bras Med Esporte, *29*, 1–4.

APPENDICES

APPENDIX 1 – CHECKLIST AND ETHICS FORM

	CHECKLIST OF INSTRUCTIONS FOR STUDENTS	✓
1	Complete Section 1 to Section 13	
2	Electronically sign and date	
3	Participation information form	
4	Participation consent form	

Jing BTEC Research Ethics Form

BTEC Level 6 – Professional diploma in advanced clinical sports massage

Section 1: to be completed by student

Student's name:	Mandy Le Messurier
BTEC Year-group:	2022-24
Date of application:	August 2023
Student email address:	
Title of research project:	The effect of rehabilitation exercises on ankle instability in non-professional footballers.

Section 2:
Does your project involve any primary research using human subjects?
Please delete as appropriate.

	YES	**NO**
Does your project involve any primary research using human subjects?	**x**	
If yes, does it involve children under 16?		**X**
If yes, does it involve children under 18?		**x**
Other vulnerable populations (i.e. mental illness, aged subjects)?		**x**

Does your project involve NHS patients, NHS staff or Local Authority Service Providers? *If yes, you must obtain 'external ethics approval' for your proposal before the form can be signed-off by 'Jing' and before you can start your fieldwork.*		**x**
Are you planning to use deception?		**x**
Are you collecting sensitive personal data such as sexuality, mental health data, etc?		**x**
Does your project make use of a validated questionnaire?	**x**	
Does your project make use of a new/adapted questionnaire or semi-structured interview checklist?		**x**

Section 3:

Where is your research being undertaken? At KGV sports ground and Aztec sporting complex Alba clinical massage studio		
If your research is being undertaken outside of your own premises, do you have written confirmation from the establishment involved? If yes, please provide evidence.	YES **N/A**	NO

Section 4:

How will you recruit subjects for this research study? All football players are from the same non-professional football club and are known to the researcher. All participants are over 18yrs.

Section 5:

How will you manage participant confidentiality? Ensure that the information refers to GDPR and is compliant with this legislation.

All information to held in accordance with ODPR in Guernsey.
All participants will be informed of how their data will be stored, who has access to it, which is just the researcher.
Participants names will be replaced by a number to maintain confidentiality.
All data will initially be in paper form until results are correlated, then will be destroyed.
Participants will agree to the whatsapp group for the purpose of video sharing and to ensure all questions and answers are available to everyone.

Section 6:

- Outline your project procedure.
- Recruit players from known football club over the age of 18.
- Arrange a group chat at training to answer any questions related to the study.
- Discuss the Football Ankle Disability Index (FADI) and the format of recording to take place and frequency.
- Ensure all participants have completed the participants consent form.
- There will be a 1-1 assessment with each participant to measure their ankle dorsi flexion using the Y balance test tool.
- Participants will receive a massage to both ankles and calves once a week at training or at studio.
- Weeks 1 to 6 form the control period. During this time there is no change to the players normal training routine. Each week the FADI will be completed and returned to the researcher after training sessions.
- Weeks 7-12 will be the intervention period and during this time rehabilitation exercises will be given to participants.

- Exercises to include ROM, banded inversion and eversion, calf raises and weight bearing lunges, which will be available on the WhatsApp group in video format with a printable PDF.

- All participants will have a hands on massage of their lower leg once a week at training or at my studio.

- Rehabilitation exercises will be sent each week by video on WhatsApp to participants. These exercises will include a short daily stretch routine and a strengthening programme to be performed x 4 per week in addition to their ongoing normal training sessions.
- Questionnaires to be completed and handed to researcher at their

Wednesday training sessions each week. Participants will inform the researcher how many times they were able to perform the rehabilitation routines each week.

- On week 12 a final assessment will be completed. This will include reassessing ankle using Y balance test tool.
- On week 12 a final questionnaire and de-brief questionnaire will then be completed by participants to provide insights for the researcher about the study.

2. Briefly describe, **what your participants** have to do

E.g. will they be interviewed? Where, for how long? Will they complete a Questionnaire? Will they receive a treatment intervention? Will they be involved in a group discussion?

- Attend usual football training every Wednesday.
- Complete a consultation and agree to participate in the study.
- Throughout the study, complete FADI questionnaire every Wednesday. Reminder sent on Tuesday and spare forms will be available at training to complete.
- All participants will have their ankle flexibility measured using the Y balance test tool at Weeks and 12 of the study.
- All participants will be part of a group chat and will need to agree to be in this WhatsApp group.
- All participants will complete the exercises from week 6-12 which will be videoed and on the group chat.
- All participants will do one group of flexibility exercises daily, which will take 2 minutes and one group of strengthening exercises 4 times a week that will take between 5-10 minutes to complete.
- Participants will inform the researcher how many times they were able to perform the exercises each week.
- All participants are required to inform the researcher of any other medical or therapy Intervention, that could interfere with the results of the study.

Section 7:

What sort of materials or stimuli will your participants be exposed to?

	YES	NO
Questionnaires	**x**	
Pictures (will you take a photo of participants)		**x**
Sounds	**On video**	
Words	**in questionnaire**	
Other	**x**	

If using a questionnaire you are required to attach an example.

Pictures may be taken to demonstrate the protocol used as a submission to the dissertation. Any physical features that can personally identify participants of the study will be deleted and permission is required from participants before taking any pictures.

For 'Other' please elaborate:
Exercise videos will be given to all participants via WhatsApp.

Section 8:

What sort of people will the subjects be? E.g. people with non-specific back pain, women above 55 years or people diagnosed with osteoarthritis

- All participants will be within the same team, over the age of 18, Known to the research.
- They must have had a previous ankle injury within the last year?
- Participants will be excluded if they have had surgery to the ankle where bones have been pinned/plated.

Section 9:

If your research study involves minors, how will you obtain participation permission and who is the responsible adult?

N/A

Section 10:

Special Issues. Give brief details of other special ethical issues and the controls you will put in place to minimise ethical risk.

- Qualified and insured therapist.
- All participants' information will be held in a secure, locked location that only the researcher has access to.
- Safe and private environment for assessment process.
- During the consultation process, the researcher will be mindful and observant of any situation that could affect the player and results during the study.
- Resources in place to refer participant for further review or assessment should the occasion arise during the study.
- Support will be available for participants injured during the football games throughout the time of the study.
- Ensure participants respect confidentiality.

Section 11

What procedures will you follow in order to guarantee the confidentiality of your participants' data?

- Record participants name, contact details and date of birth, which will be held in a separate locked cabinet to the medical and other personal information compiled during the study.
- Assign each participant a number from the start of the study to maintain confidentiality and anonymity.
- All personal data will be deleted as soon as the study is complete.
- All data is stored in locked cabinets, within a locked and secure

environment, which only the researcher has access to.
- Participants are advised to be respectful of other participants and not share any information especially from WhatsApp group.

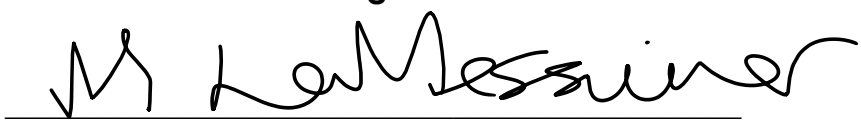
Section 12

Does any of the following apply to your research study?	YES	NO
It requires participants to give information of a personal nature		**x**
It involves minors or other vulnerable individuals;		**x**
It involves paying participants or an alternative incentive to participate		**x**
It could put you or someone else at risk of injury.		**x**

Section 13:

I understand that I can only start my project, once this ethical application has been approved. This applies to ALL projects, whether using human participants or not.	YES **x**	NO

Student's handwritten signature:



(To be completed, once ethical approval has been provided)

Print Name: Mandy Le Messurier

Date: March 2024

IMPORTANT

Consent

Informed consent must be obtained for **all** participants before they take part in your project. The Consent Form (example below) should clearly state the parameters and content of the research. It should explain what is expected of the participants and what they will be doing. It should draw specific attention to any elements that could conceivably cause subsequent objections, and the measures you are taking to ensure the confidentiality of their data. It should also state that the participants are free to withdraw from the study at any time. Studies carried out in schools require the permission of the head-teacher, and of any responsible adults as per the head teachers' recommendation. Minors aged over 14 years should also sign an individual consent form themselves. If you are planning to carry out a project whereby you will be in contact with minors, you must establish from the head-teacher or other responsible adult whether the work proposed will require you to have the relevant DBS disclosure. Please seek advice from your Local Authority.

You must complete a consent form for every participant involved in your study.

APPENDIX 2 – INFORMATION FOR PARTICIPANTS

PROJECT TITLE: The effect of rehabilitation exercises on ankle instability in non-professional footballers.

STUDENT NAME: Mandy Le Messurier
STUDY LOCATION: Guernsey
Tel: -
email:

INFORMATION FOR PARTICIPANTS

Important
Please be advised that any you can withdraw your participation from this study at any time. There is no need to submit a reason and there will be no consequences to you as a result of withdrawing.

What will be expected of you, the participant?

- All participants will be required to complete this consent form.
- All participants must commit to participating for 12 weeks.
- All participants will have a small health questionnaire to complete prior to range of motion testing by the researcher.
- All participants will complete a Foot and ankle disability index each week on Wednesdays for WGFC, for the duration of the study.
- All participants will have measurements of their ankle movement using the Y balance test tool at weeks 1and 12 of the study.
- All participants will receive one hands on massage treatment to their lower leg once a week.

What does the initial consultation and research study involve?

- Small health questionnaire with measurements of your ankle movements to be completed at the initial consultation.
- Weeks 1-6, All participants will complete the questionnaire and hand to the researcher on Tuesdays/Wednesdays at training, for 6 weeks prior to the intervention part of the study, to set a baseline.
- Weeks 7-12 is the intervention period, and all participants will have the same exercises to complete each week for the 6 weeks of the intervention phase of the study.

- The exercises will comprise a daily stretching routine that will take about 2 minutes, participants will perform a strengthening routine that will take about 5-10 minutes to complete.
- Participants will inform the researcher how many times they were able to perform the exercises each week.
- All participants will complete a final questionnaire at 12 weeks along with a feedback form.

Are there any risks involved?

There are no risks associated with this study.

What are the potential benefits to you; the participants?

- Improved ankle stability
- Reduced time in rehabilitation
- Prevention of injury
- Stronger ankles will help to reduced non-impact ankle injuries during games and training.

How the results of the study will be used

Your data will be mathematically analysed together with all the other participants' data, and the findings from this analysis will be communicated to the project supervisor and possibly other practitioners. Communication of the findings may be in the form of all / any of the following: a dissertation, reports in scientific journals, articles in newsletters, and presentation at a conference.

Confidentiality

All data and personal information will be stored securely in accordance with the terms of the General Data Protection Regulation (GDPR), 2018, and will be accessible only by Mandy Le Messurier. After completion of the study, all data will be made anonymous (i.e. all personal information associated with your data will be removed). Your data will be anonymous in any written reports, articles, and presentations of the results of the study.

What to do now you have decided to participate

If you would like to participate, please return a completed consent form to Mandy Le Messurier.
If you have any further questions, please contact **me** on the telephone number or email address above. Thank you.

APPENDIX 3 – PARTICIPANT CONSENT FORM

PARTICIPANT CONSENT FORM

Title of study: The effect of rehabilitation exercises on ankle instability in non-professional footballers.

Name of student: Mandy Le Messurier

- I have read the information sheet about this study
- I have had an opportunity to ask questions and discuss this study
- I have received satisfactory answers to all my questions
- I have received sufficient information about this study
- I understand that I am / the participant is free to withdraw from this study:
- At any time
- Without giving a reason for withdrawing
- That I am free to refuse to answer any question without saying why
- That the services I am receiving will not be affected whether I participate or not.
- I understand that my research data may be used for a further project in anonymous form, but I am able to opt out of this if I so wish.
- I agree to take part in this study

Signed (participant)	Date
Name in block letters	
Signed (parent / guardian / other) (if under 18) N/A	Date
Name in block letters:	
BTEC students contact details (including telephone number and e-mail address)	

Section 3: Jing 's assessment (to be completed by Jing)

EITHER:
This project is not designed to include fieldwork with human participants. Insofar as secondary data are to be used, I am confident that appropriate procedures are in place for data protection and non-disclosure of any personal or confidential data.

Signature: .....date: .....

OR:
This project is designed to include fieldwork with human participants.
(please circle yes or no)

YES / NO All necessary statutory, legislative or other formal external approvals have been obtained (e.g., permissions, police checks, external research ethics and governance approvals in the case of research involving NHS staff or patients or Local Authority service providers or users).

YES / NO The design of this study ensures that the dignity, welfare and safety of the participants will be ensured and that if children or other vulnerable individuals are involved they will be afforded the necessary protection.

YES / NO I am confident that participants will be given all necessary information before the study, in the consent form, and after the study if necessary.

YES / NO I am confident the participants' confidentiality will be preserved.

YES / NO I consider that any risks involved to the student, the participants, and any third party are minimal.

YES / NO I consider that Departmental approval should be given, since ethical risks have been appropriately addressed in the proposal and I am confident that steps will be taken to minimise any risks.

Signature: ..... date: .....

If a second opinion was sought from a research ethics expert, the advisor should also sign this form below:
Advisor's name (please print):

Advisor's signature: ..... date: .....

APPENDIX 4 – YBT SCORE SHEET

YBT™ Y BALANCE TEST

SCORE SHEET

NAME:_____

DATE:_____/_____/_____

Lower Quarter: Right LE Limb Length: _____cm (Distal ASIS to Distal Medial Malleolus)

DIRECTION	GREATEST RIGHT	GREATEST LEFT
Anterior		
Posteromedial		
Posterolateral		

Upper Quarter: Right UE Limb Length: _____cm (C7 to tip of Longest Finger)

DIRECTION	RIGHT TRIAL 1	RIGHT TRIAL 2	RIGHT TRIAL 3
Medial			
Inferolateral			
Superolateral			

LEFT TRIAL 1	LEFT TRIAL 2	LEFT TRIAL 3

DIRECTION	GREATEST RIGHT	GREATEST LEFT
Medial		
Inferolateral		
Superolateral		

Composite Right Score: Upper_____ Lower_____

Composite Left Score: Upper_____ Lower_____

Composite Reach Distance:
Composite score = ((sum of the greatest reach in each direction) / (3 x Limb Length)) x 100.
Calculate the composite scores for left and right separately.

Research validated composite score cut points for age, gender, and sport/activity are available through the Move2Perform software www.move2perform.com

APPENDIX 5- FADI QUESTIONNAIRE

The Foot and Ankle Disability Index (FADI) Score and Sports Module

Patient Name: _____ Date: _____

Please answer every question with one response that most closely describes your condition within the past week by marking the appropriate number in the box. If the activity in question is limited by something other than your foot or ankle, mark N/A.

0 Unable to do
1 Extreme difficulty
2 Moderate difficulty
3 Slight difficulty
4 No difficulty

L- left ankle R- right ankle B- both

Standing			Walking up hills		
Walking on even ground			Walking down hills		
Walking on even ground without shoes			Going up stairs		
Walking on uneven ground			Going downstairs		
Stepping up and down kerb/pavement			Squatting		
Sleeping			Coming up to your toes		
Walking initially			Walking 5 minutes or less		
Walking approximately 10 minutes			Walking 15 minutes or greater		
Home responsibilities			Activities of Daily Living		
Personal Care			Light to moderate work (standing, walking)		
Heavy work (push/pulling, climbing, carrying)			Recreational activities		

Running			Jumping		
Landing			Squatting and stopping quickly		
Cutting, lateral movements			Low-impact activities		
Ability to perform activity with your normal technique			Ability to participate in your desired sports as long as you would like		

Sports Module:

Pain related to the foot and ankle:

0 Unbearable
1 Severe Pain
2 Moderate Pain
3 Mild Pain
4 No Pain

General level of pain			Pain at rest		
Pain during your normal activity			Pain first thing in the morning		

Researcher Use Only: Score: _____/136 points (FADI 104 points & SPORTS 32 points = no disability 136) Session no _____ Gender: M F

Age: ____

APPENDIX 6 – PARTICIPANTS DATA

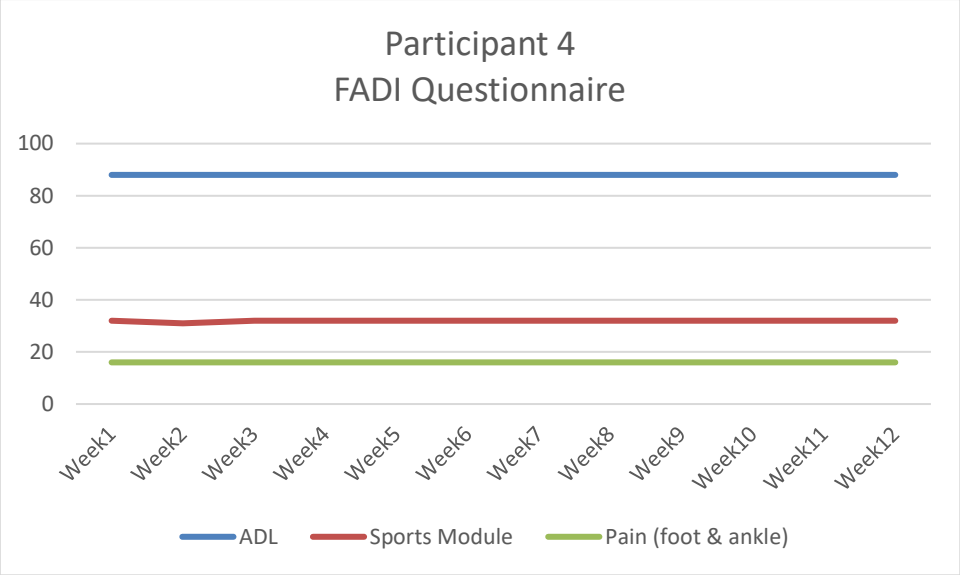


FIGURE 1 SHOWING WEEKS 1-12 OF FADI SCORES
0 unable to move – 4 no pain

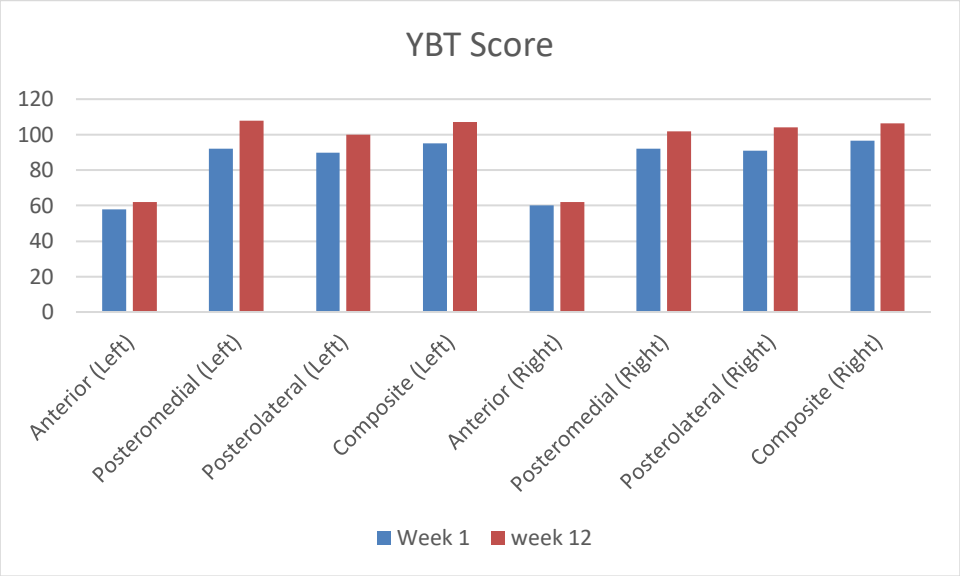
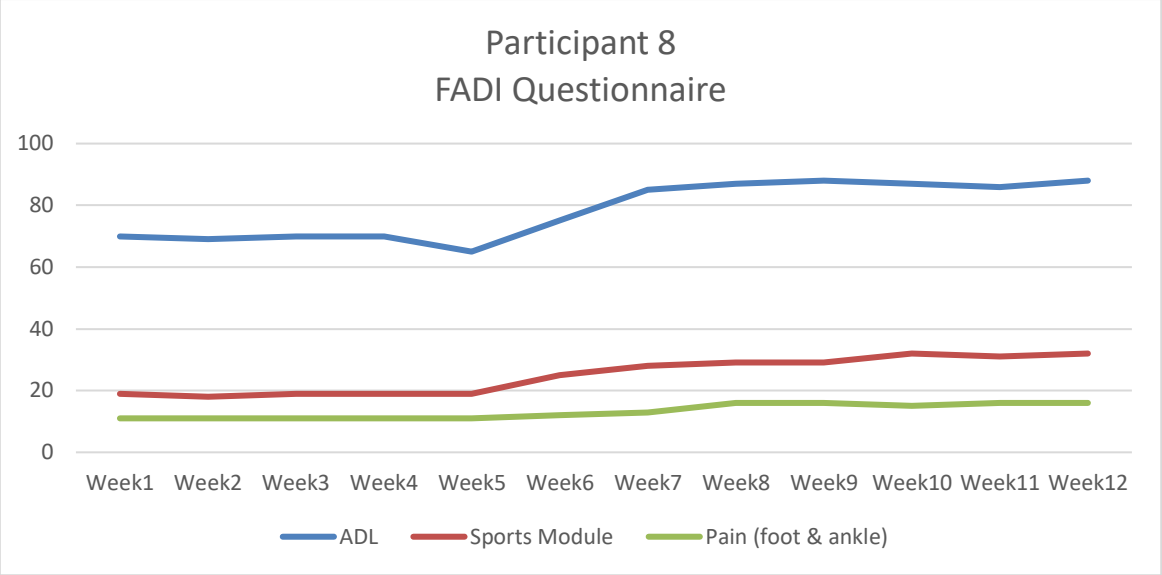
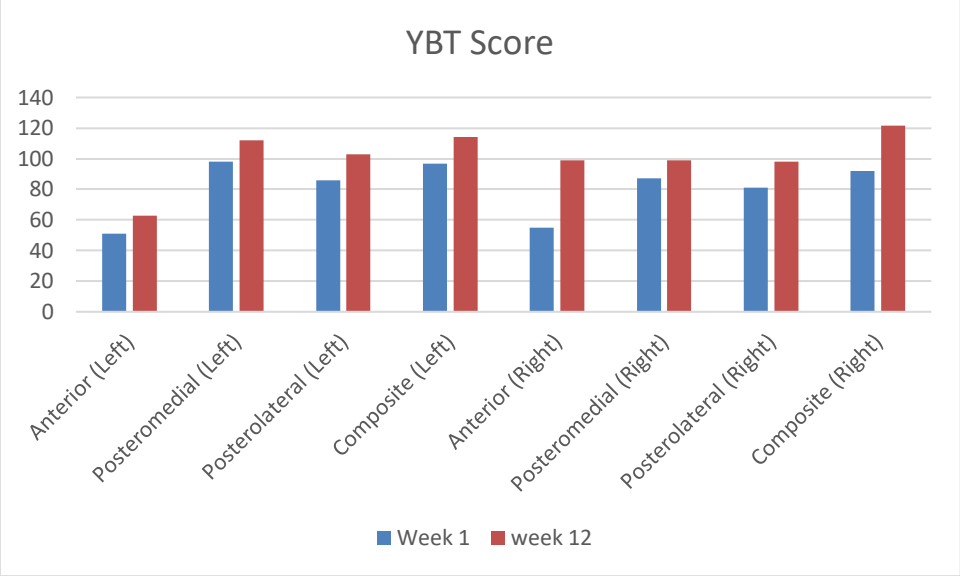


FIGURE 2 SHOWING WEEK 1 AND 12 YBT SCORES


Participant 8
FADI Questionnaire
100
80
60
40
20
0
Week1 Week2 Week3 Week4 Week5 Week6 Week7 Week8 Week9 Week10 Week11 Week12
ADL
Sports Module
Pain (foot & ankle)


YBT Score
140
120
100
80
60
40
20
0
Anterior (Left)
Posteromedial (Left)
Posterolateral (Left)
Composite (Left)
Anterior (Right)
Posteromedial (Right)
Posterolateral (Right)
Composite (Right)
Week 1
week 12

APPENDIX 7

Jing dissertation
Mandy Le Messurier

uk.physiapp.com
PhysiApp code: **gbqsxtix**

1 Set / 1 Rep

1. Alphabet ankle exercise

Sit down with your legs extended or hanging off the table.
Draw the capital letters of the alphabet with your ankle, accentuating all of the ranges of motion.

Complete this exercise daily for the full 12 weeks.

1 Set / 10 Reps / 1 s hold

2. AROM plantar flexion/dorsi flexion

Lie with your legs straight out in front of you.
Keeping your knees straight, point your toes down as far as you can go.
Next, pull your toes up towards you as far as you can go.
Continue to point your toes, then pull your toes at a steady rate.

Complete every morning x 10 each side, for the 12 weeks.

1 Set / 10 Reps

3. AROM ankle circles

Lie down on your back with your legs straight out in front of you.
Make circles with your ankles, then change direction to make circles in the other direction.

Inversion and eversion movements as shown on whatsapp group x 10 daily for 12 weeks.

1 Set / 5 Reps

4. Resisted ankle plantarflexion

Place a band underneath your foot and hold the other ends in your hands to create some tension.
Point your toes down against the resistance of the band, then control the movement as you return to the start position.
Make sure to keep your knee straight during this exercise.

Complete 5 reps x 3 a week, after completing usual daily exercises.

1 Set / 5 Reps

5. Resisted ankle dorsiflexion

Start in a seated position with your legs extended.
Take the band and place it around your feet.
Next, bend your knee on the affected side so that your heel is resting on your shin.
Pull the toes of the affected side up towards your head as you maintain tension in the band.
The unaffected foot acts as an anchor to allow more tension to be created in the band.
Relax to the starting position and repeat.

Complete 5 reps x 3 weekly after usual exercises for the last 6 weeks of the study

1 Set / 5 Reps

6. Resisted ankle inversion

Place a band around the end of each foot.
Cross the affected leg over the other leg, then pull against the resistance of the band to turn the foot away.
The unaffected foot acts as a stabilizer and allows you to create more tension in the band.
Return to the starting position.

Complete 5 reps x 3 weekly, completing normal daily exercises before the banded, for the last 6 weeks of the study.

1 Set / 5 Reps

7. Resisted ankle eversion

Place a resistance band around the ends of each foot.
Make sure your feet are spread apart, so there is tension on the band.
Use the unaffected foot as an anchor as you turn the affected foot outwards, away from the body.
Control the return back to the starting position.

Complete x 5 3 times a week after usual exercises, for the last 6 weeks of the study.

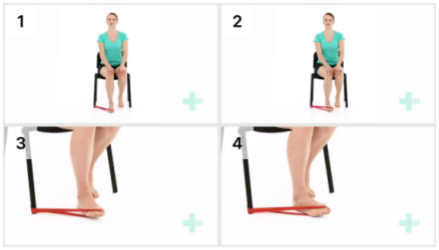
1 Set / 5 Reps

8. Resisted ankle eversion in sitting

Sit upright in a chair with a resistance band tied in a loop.
Place the band around the base of your toes, and move your feet apart to gain some tension in the band.
Keeping your unaffected foot still, turn your affected foot outwards, keeping your heel in the same position on the floor.
Control the movement as you bring your foot back in to the neutral position.

Alternative movement for the banded resisted movement.

1 Set / 5 Reps



9. Resisted ankle inversion in sitting

Sit upright in a chair with a resistance band tied in a loop.
Place the band around the base of your toes on your affected foot, around the leg of the chair.
Ensure there is some tension in the band.
Turn your affected foot inwards against the resistance of the band, keeping your heel in the same position on the floor.
Control the movement as you bring your foot back in to the neutral position.

Alternative positioning for the banded resisted inversion.