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Mitigating Asymmetrical Problems Of Football Athletes In fluenced By Corrective Exercises

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ABSTRACT

Purpose of the study: One system used in identifying athletes with a high risk of experiencing sports related physical injuries is Functional Movement Screen. In considering the screening of movement patterns, the FMS readily identifies functional limitations and asymmetries. This research sought to determine if FMS composite score can mitigate asymmetrical problems among football athletes when corrective exercise program is introduced and used.

Methodology: Thirty-three football players of Benguet State University divided into exercise and control groups with the former subjected to a corrective exercise program to find out if there is a significant reduction of asymmetry problems among the athletes in the post-test. The level of significance was set at $\alpha = .05$.

Main Findings: Results revealed that the athletes in the exercise group reduced their asymmetrical problems significantly compared to those who belong to the control group.

Novelty/Originality of this study: With this finding, it can then be concluded that with the use of corrective exercise programs, asymmetrical problems can be improved among athletes.

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1. INTRODUCTION

Most athletes have a dominant or favorite side of their body in practically every physical event. This can result in muscular imbalances or asymmetries, including disparities in flexibility, and is commonly regarded as a risk factor for injury [1]-[3]. Most instructors refer to this dominant or preferred side of the body as the strong side for the dominant side and the weak side for the non-dominant side [4], [5]. Because both sides of the body can be trained and prepared to be developed equally as powerful sides, this is an idea that the Functional Movement Screen (FMS) attempts to address [6]-[8].

Furthermore, rather than identifying deficiencies in sports-related movement, the FMS focuses on identifying areas of movement pattern limitations and asymmetries in daily movement [9]-[11]. As a result, athletes who train with poor movement patterns may cause movement deficiencies, which may result in injury, prompting those who work with athletes to screen and quantify their movement patterns [12]-[14].

The FMS consists of seven basic movement patterns, or tests, that put the subject in extreme positions where deficiencies and imbalances are apparent if proper mobility and stability are not used [15], [16]. In order to

maintain high performance, athletes with mobility, stability, or both problems have usually developed compensatory movement patterns [17], [18]. The athlete performs the majority of these compensatory motions subconsciously. Poor movement patterns are reinforced if compensations persist, which can result in poor biomechanics and eventually the risk of micro- or macro-traumatic damage. A composite score is produced to indicate the person's overall FMS score following the completion, evaluation, and independent scoring of the seven tests [19], [20].

The objective of corrective exercise, is to eliminate or lessen quantifiable dysfunction in basic and functional movement patterns. In the Functional Movement System, every corrective exercise follows a straightforward but very specialized course, regardless of the particulars of the individual's or group's corrective needs [21]-[23]. First, a functional screen or evaluation that creates a movement baseline serves as the basis for remedial exercise. Patterns will be ranked and rated during the screening and assessment process. It will show important details about movement pattern dysfunctions such pain, difficulty, and asymmetry. As a result, screening and evaluation will reveal problematic movement patterns that should not be trained or exercised until they are fixed. Second, the framework for corrective workouts will help trainers, coaches, and players make the best decisions for corrective categories and activities [24], [25]. Third, practitioners should compare the movement pattern to the initial baseline after completing the remedial exercises for the first time. It's critical to record any changes and utilize this knowledge to adjust strategies in subsequent meetings. Fourth, practitioners should rescreen or reassess when a clear shift in the main pattern is observed in order to identify the next priority and to find other movement modifications. If other patterns show no discernible progress, at least be aware of the next remedial strategy that will have a stronger basis [26]-[28].

Experts in sports science and allied fields have noted that the FMS is a reliable test for predicting injuries in athletes. For instance, looked at the connection between professional football players' FMS scores and their risk of incurring a major injury within a single season of competition [29], [30]. According to the authors, professional football players who scored 14 or lower on the FMS composite were more likely to have a serious injury over a single season [31], [32]. In addition to validating the earlier findings, a follow-up study found that players with any asymmetry on the FMS, regardless of their overall score, had a 2.3-fold increased risk of getting hurt.

Chorba, Chorba, Bouillon, further supported these findings in a study that examined whether compensatory movement patterns put female collegiate athletes at risk for injury and whether the FMS could be used to predict injury in this population over the course of a competitive season. During their data analysis, the researchers employed the FMS score of 14 as the crucial score in order to ascertain correlations between FMS scores and injury [33]-[35]. The researchers discovered that a lower FMS score was substantially linked to injury, with 69 percent of people who scored 14 or lower suffering an injury and having a four-fold higher risk of getting hurt. It was subsequently determined that compensatory basic movement patterns, which may be detected with the FMS, will raise the risk of injury in female collegiate [36], [37].

However, there are also noticeable muscle asymmetries in the upper extremities that result in injury. It is often known that overhead athletes, like baseball and tennis players, have imbalances in their muscular strength and range of motion (ROM), which can result in shoulder soreness. To be more precise, players have less internal ROM and more external ROM [38]-[40]. Additionally, athletes' posterior musculature is tighter than that of their non-dominant arm. Glenohumeral Internal Rotation Deficit, or GIRD, is the most often used term for this disorder.

To address the problematic movement patterns, an athlete should be given an intervention program that includes remedial workouts if their FMS scores are insufficient. Corrective exercise aims to eliminate or lessen quantifiable impairment in basic and functional movement patterns. Theoretically, remedial workouts can reverse the effects of inadequate training and aid in the body's recovery from injuries. The FMS requires practitioners to be able to improve their clients' poor mobility scores, which makes the idea of corrective exercises essential.

With the availability of this data establishing the score of 14 on the FMS as a crucial point in injury prevention, the researcher was then drawn to come up with an investigation regarding this topic and laid the following purpose and objective. The findings of the study will serve as an anchor for curriculum planners for physical education to consider movement screening as a regular activity in their physical education classes so that it will not just be limited to physical fitness testing. Moreover, results will be an important data base for coaches not only in grassroot programs but including those active in recreational sports and clubs. For the reason that right and left asymmetry in the FMS has also been related to injury, the main purpose of this study is to examine if more players were free of asymmetry at the end of the corrective exercise program compared with that of the beginning of the said program.

2. RESEARCH METHOD

In this quasi-experimental study, pre and post Functional Movement Screen testing were utilized. Active players of the Benguet State University Football Club were considered in this study [41], [42]. The active players were those who are officially a member of the club that attend the regular training as scheduled. All of the participants underwent the process of pre-FMS testing then were randomly divided into exercise and control

groups. The exercise group was subjected to an intervention and corrective exercise program aside from the regular training they had. On the other hand, the control group in this study did not have any intervention program but still participated in the regular training sessions. The post test was conducted after four weeks since it is the only time frame the coaches allowed the researcher to intervene.

The participants in the study were 33 male collegiate athletes who are members of the BSU Football Club. Among the participants, 16 were under the exercise group and the other 17 composed the control group. The athletes were required to sign a consent form indicating their voluntary and willingness to participate approved by their coach. Athletes that are not cleared for physical activity due to previous or current injury were excluded from this study.

The FMS scoring criteria was used in this study to gather pre and post test scores. The equipment includes a four-foot dowel rod, a two-by-six board, hurdle, mats, dumbbells, and a medicine ball. The participants involved in the study were evaluated on the FMS using the standard 1-3 ordinal system. A score of 3 was given for performing the specific movement perfectly, a 2 when the movement was completed with some compensatory movements observed, a score of 1 was given when the participant could not complete the movement. Data gathering commenced immediately after a proper demonstration of the mechanics of the seven FMS tests.

For the pre and post test, the participants performed the following tests with a maximum of three tries. Tests that were performed with the right and left sides, the lower score between the two sides was considered for data analysis. There are other two more tests under this but it was not considered in the data since it does not measure the asymmetry.

The following are the five fundamental movement screen tests of Cook et al. (2006) which was used in the study to measure asymmetry including purposes of each, The hurdle step test exhibits step and stride mechanics as well as stability and control in a single-leg stance. Athletes must properly coordinate and stabilize their hips as they lift one foot and bear the load on the other. The inline lunge positions the body to experience stresses stimulated during rotation, deceleration and lateral movements. The split stance of the legs and reciprocal pattern in the upper extremity creates a natural counterbalance, which demands spinal stabilization. Mobility and stability are tested in the foot, knee, ankle, and hip along with the flexibility of the latissimus dorsi and rectus femoris. Instead of doing a full lunge, this pattern only contains a descent and return (rather than including an initial step). The initial step is omitted because it would introduce too many variables. The shoulder mobility reaching pattern demonstrates the complementary natural rhythm of the scapular-thoracic region, thoracic spine, and rib cage during reciprocal upper-extremity shoulder movements. The pattern examines flexion, external rotation, and abduction in one extremity and bilateral shoulder range of motion, along with extension, internal rotation and adduction in the other. The active straight leg raise identifies core stability, flexed hip mobility, and the available hip extension of the alternate hip. This movement challenges the athlete's ability to dissociate the lower extremities from the stable core. The rotary stability movement pattern examines multi-plane pelvis, core, and shoulder-girdle stability along with combined upper and lower extremity movements. It identifies reflex stabilization and weight-shifting in the transverse plane, as well as requiring the execution of coordinated efforts of mobility and stability of fundamental climbing patterns.

Table 1. The Corrective Exercise Program

Corrective Exercises	Sets	Repetition/counts	Days per Week
1.Leg Lowering	3	10	3
2. Half kneeling hip flexor stretch	3	10	3
3. Hip hinge with bar	3	10	3
4. Seated T-spine	3	10	3
5. No money	3	10	3
6. Dumbbell swing	3	10	3
7. Chop and lift	3	10	3
8. Suit case dead lift	3	10	3

In this study, due to the small number of participants a normal distribution for the said sample size could not be guaranteed. To confirm this, the data was then subjected to a normality test by getting the skewness and kurtosis of the data distribution. It was found out that the distribution of the data in this study deviates from the normal, therefore, statistical analysis using parametric tests would not be appropriate in treating the data. Instead, the statistical tests were non-parametric which do not assume data as normally distributed and is appropriate with small samples. The FMS scores of the athletes were the main data that was analyzed in this study. The Mcnemar test was used to answer whether or not the experimental group was free of asymmetry after the intervention of a corrective exercise program. All statistical tests done in the study have levels of significance set at 0.05.

3. RESULTS AND DISCUSSION

This chapter presents the analysis and interpretation of the FMS pre-and post-test composite score gathered from the thirty-three male active members of the Benguet State University Football Club. It focuses on the effects of corrective exercise on the composite scores of the athletes and if these corrective exercises helped reduced or repaired asymmetrical problems among them.

The effect of the exercise program on the asymmetrical problems of athletes is presented here. Table 2 shows the distribution of the participants who were subjected to the intervention of corrective exercises under the exercise group. Among the 16 participants in the exercise group, there were 13 who tested positive for asymmetry during the pre-test.

After the intervention and post-test was done, it was found that only five (5) participants from the control group were tested positive for asymmetry. This decrease in the number of participants having asymmetrical problems was tested statistically using the McNemar test and it revealed that there is a significant reduction among the participants of the experimental group regarding asymmetry.

On the other hand, the same table (Table 2) shows the distribution of the respondents from the control group with respect to asymmetry. All of the 17 respondents tested positive for asymmetry during the pre-test. After the post-test, only one respondent was found to be without asymmetry while the rest of the 16 respondents were still tested positive for asymmetry. This shows that there is no significant difference between pre-test and post-test scores of the control group with respect to asymmetry. To confirm this, statistical analysis using the McNemar test reveals that the reduction of asymmetrical problems under the control group is not significant.

Table 2. Effects of corrective exercises on the asymmetrical problems of athletes under the exercise and control groups.

	Pre Test		Post Test		McNemar Test Pre test and Post test	
	With asymmetry	Without asymmetry	With asymmetry	Without asymmetry		
Exercise Group	13	3	5	11	N	16
					p value	0.008
Control Group	17	0	16	1	N	17
					p value	1.000

Note: significant at $\alpha = 0.05$

The findings of the study were conferred in this chapter in order to provide a clearer outlook about it. This includes the implications of the results as well as arguments based on the fact that there are previous studies related to this and the limitations involved in this study. The focus of the chapter, however, is mainly on the effect of corrective exercises on the FMS scores of BSU soccer athletes and on its capability in reducing asymmetrical problems among them.

The main topic investigated in this study is the reduction of asymmetrical problems among the athlete participants since musculoskeletal asymmetry is already established as an injury risk factor as pointed out on their study regarding star excursion balance test as a predictor of lower extremity injury among high school basketball athletes, for their investigation on the effects of generalized joint laxity on the risk of ACL injury among young female athletes and, on their work regarding preseason muscle imbalance as a possible risk factor for hamstring injuries among competitive sprinters.

As it is shown in the result under the exercise group, the numbers of athletes having asymmetrical movements were reduced after the intervention of corrective exercise program which directly supports the findings of in their study concerning professional football players. The result (Table 2) would suggest that the corrective exercise program was not only able to improve poor total body movements but was also able to neutralize some of the asymmetries that were present among the soccer athlete participants. While there is clear evidence of the reduction of symmetrical movements among the athletes under the exercise group, the control group reveals (Table 2) a reduction of asymmetry as well, however, it was found to be not significant. This could be due to the fact that the athletes knew about the post-test and might have prepared for it. It is also possible that their training has something to do with it since their sport specific movements are focused more on the lower extremities. Observation could also be added as a factor, while the exercise group is busy with the intervention, the control group might be keenly watching and might be able to mimic some of the corrective exercises being performed. This was not controlled since both groups were supposed to be around during their regular practice and the researcher only barrowed a few minutes of their time for the experiment and doing this on a separate date was not permitted by the concerned coaches for the date and time will be for rest and recovery.

Nevertheless, additional limitations should be considered regarding this study. It is not that far that participants unconsciously received similar intervention activities or modalities such as massage and other similar actions that might have influenced the scores of the participants in this study. Individual differences of athletes and their attitude towards the exercise program and the research process in general may somewhat affected the results [43], [44]. Another thing could be the absence of a short term or weekly follow up assessment to monitor the possibility that changes in the score could have already occurred even before the terminal four-week time as stated in the methodology.

In light of the findings, the following are proposed: (a) movement screening and corrective exercise programs should be made as an equally important parcel of the whole sports training package by sports and athletic stakeholders. This will definitely help sports coaches in the preparation of their training programs in order to reduce asymmetrical problems among athletes while improving performance. (b) The findings are very timely for the senior high school physical education teachers, particularly under the sports track due to the fact that movement screening is a major topic under the curriculum. This will serve as a solid and clear example on how movement screening function on an actual athletic endeavor. (c) Considering injury prevention and performance enhancement, screening and corrective exercise programs should be considered by all sports and athletic stake holders to reduce asymmetrical problems while improving performance. (d) These findings will support coaches in the preparation of their training programs and for Physical Education teachers to consider it side by side with the physical fitness test. (e) Further studies are also necessary to determine if the supposed improvement in the asymmetrical concerns of athletes brought about by corrective exercise programs could actually reduce injury risk. (f) Future similar researches could also use video recording during the scoring process and let a second or even a third research assistant to score using the video to check the consistency of scoring and thus minimizing bias. (g) Finally, researches regarding the effect of corrective exercises on asymmetry could be further accomplished with a longer period of examination coupled with short term assessments in between.

Moreover, it revealed that asymmetrical concerns among football players could be reduced by utilizing corrective exercises. Although the results of this study could only be applied to athletic participants, it could not be generalized to be true in other sports disciplines. Another thing is that the limitations and asymmetries in fundamental movement patterns which the FMS is trying to measure are basic components of human movement and are not being considered as sport specific. Therefore, it is also important to perform additional studies regarding this topic not only in sports but in other active populations as well.

4. CONCLUSION

Based on the findings presented in the "Results and Discussion" chapter, it can be concluded that the expectations outlined in the "Introduction" chapter regarding the effectiveness of corrective exercises in reducing asymmetrical problems among athletes were met. The study demonstrated a statistically significant reduction in asymmetry among the experimental group who underwent a corrective exercise program, in contrast to the control group, which did not show significant improvement. This supports the hypothesis that corrective exercises are effective in addressing musculoskeletal asymmetries, which are known risk factors for injury in athletes. These findings reinforce the potential of integrating movement screening and corrective exercise interventions as standard practices in athletic training programs. Furthermore, the research opens up prospects for future studies to explore the long-term impact of such interventions, their applicability in different sports and active populations, and improvements in research design such as incorporating regular short-term assessments and objective scoring through video analysis. The results of this study thus contribute meaningfully to both the theoretical understanding and practical application of injury prevention strategies in sports science.

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