

Effect of small sided 3v3 playing exercise on CMJ performance for U17 football Players

تأثير الألعاب المصغرة 3 ضد 3 على أداء CMJ للاعبي كرة القدم تحت 17 عامًا

Abderrezak BOUDOUANI¹

¹ Institute of Physical Activity Sciences and Technologies, University of Chlef, Algeria,
a.boudouani@univ-chlef.dz.

Received: 19/03/2025

Accepted: 23/03/2025

Published: 30/06/2025

Abstract:

The objective of our study is to optimize situations with balloon. 24 players from the U17 inter-league level participated in all randomized entry-exit evaluation tests and training protocol, divided into 2 groups U17(n=12) and U16(n=12) of respective age, CMI tests show a significant difference in pre- and post-protocol.

The RPE shows a slight deterioration in the U16 team's performance compared to a moderate deterioration in the U17 team's performance. The dominant force is the equivalent force of a density of 104 13 m2 per player (model Nick BROAD), this confirms the effect of our type of games on the neuromuscular plane. So a training with a contextualized 3c3 game is effective on the performance in CMJ.

Keyword: 3Vs3Game; CMJ; (U17) Football Players.

ملخص:

الهدف من دراستنا هو تحسين المواقف باستخدام الكرة. شارك 24 لاعباً من فرق البطولة تحت 17 سنة في جميع اختبارات التقييم القبلية والبعدية والبرنامج التدريبي المقترح، مقسمين إلى مجموعتين تحت 17 سنة (ن = 12) وتحت 16 سنة (ن = 12) من الأعمار المعنية، وبعد المعالجة الإحصائية أظهرت اختبارات CMJ فرقاً معنوياً بين الاختبارين. يُظهر RPE تدهوراً طفيفاً في أداء فريق تحت 16 سنة مقارنةً بتدهور معتدل في أداء فريق تحت 17 سنة. القوة المهيمنة هي القوة المكافئة لكثافة 104 × 13 م² لكل لاعب (نموذج نيك برواد)، وهذا يؤكد تأثير نوع ألعابنا على المستوى العصبي العضلي. لذا فإن التدريب باستخدام الألعاب المصغرة (3*3) فعال على الأداء في اختبار CMJ.
كلمات مفتاحية: الألعاب المصغرة (3*3)؛ CMJ؛ لاعبو كرة القدم (تحت 17 سنة).

Corresponding author: Abderrezak boudouani, **e-mail:** a.boudouani@univ-chlef.dz

I -Introduction:

The amazing progress that football has made in recent years is a result of the development of sports facilities, equipment and equipment (Ben Kassad,2005), attention to coaching, their scientific and practical qualification, and good planning based on science with the improvement and diversification of training methods.

The preparation of players in conditions close to the course of matches what are called real situations has become a necessity obliges

Coaches must be committed to acquiring the skills required by modern football (Ghoual and Bengoua,2015,p14).

Physical preparation is not unrelated to training and concerns all the techniques aimed at developing and maintaining physical qualities (Hamek et al.,2018,p26) whose objectives are:

- Better adaptation of cardiovascular, respiratory and neuromuscular systems during exercise.
- Better recovery after effort and better management of fatigue.
- Better management of energy expenditure for better endurance.
- A development of speed, strength and muscle power.
- Development and optimization of physical factors of performance.
- An optimization of coordination, explosiveness and specific technical gestures

Today, physical preparation in football is becoming increasingly important, given the growing number of football events that are taking place nearby and significantly reducing rest and recovery time (Dellal,2008,p.48).

There has also been a significant change in competitive requirements; Essentially an increase in the frequency of high intensity efforts and their duration, as well as the distance travelled. During a major event such as the World Cup, there is a significant difference in the performance of players given their physical preparation prior to this event. In football, competitive requirements have changed significantly over the last few years.(Goual and Bengoua,2015) Since then, the example of frequencies of very high intensity efforts is compared; From 1:17" in the 1970s to 55" since 2000. Also, in terms of volume, there is little change in the distances travelled, averaging 11,000 metres for all players other than goalkeepers (Rampineni et al., 2007).

To fulfil these new requirements, the integration of mini-games in training with reference to contextualized work has become essential to achieve intensities close to those of competition.

the reduced games in football, it is a work of opposition on a small surface, which allows to work both the physical and technical-tactical aspect.

Several studies suggest that these aspects operate in a richer and more complete way compared to training without a ball (analytical), (Impellizzeri 2006, Little 2006, Riley 2004).

Nicholas and Julien (2017) addressed the physiological aspect by comparing the effect of three types of mini-games on the cardiac response and found that all three types of mini-games allowed a significant increase of the aerobic system. The study by Castellano et al (2013) also looked at the effect of changing games form on physiological requirements and found that changing the internal objectives or laws of play positively affects these physical requirements, These requirements are what he addressed Monkam (2011) in his study that some types of mini-games have an effect on the modification of heart performance with the possibility to estimate the intensity of effort for each type through the maximum pulse, and all studies have used the appropriate experimental approach,

All the results confirm that the use of mini-games has a positive effect on the physical characteristics of football players.

The benefit of mini-games is related to:

- Players will be more motivated
- the nature of the game reduces itself and its tendency to reproduce real situations realized during matches.
- the possibility of working also on tactical aspects.
- Requirements for metabolic needs that will be similar to those in the game.

However, two main things should be considered:

- The difficulty of monitoring the training load.
- Achieving an overall goal.

It is necessary to consider factors that may affect the intensity of the proposed workout. These factors are based on the objectives of the training unit, the performance level of the players, the type of exercise and the playing surface.

There is a significant relationship between the number of players and the intensity of the exercise,

studies (Grant et al. 1999; Platt et al. 2001; Jones et al. 2007) have categorised contact intensity according to the number of players competing and playing surface.

Factors that determine the type of play:

- Coach activation.
- Number of individuals.

*effect of small sided 3Vs3 playing exercise on CMJ performance
for U17 football Players*

- Performance/rest ratio.
- Playing surface.
- Labelling type.

This research was conducted for answer the following question: a training with a contextualized game 3c3, on a field of 380 m² and a density of 94m² can be an interesting job to replace analytical work with dominant force in young U17 footballers?

and for this reason we assume that the category U17 supports the proposed work better than U16 as well as we assume that the form 3Vs3 with the dimensions proposed, a work demands the dominant quality force.

II -Methods and Tools

1- Pilot Study

For the realization of our research, we saw it necessary to use the experimental method in order to answer our initial questions.

We carried out this study in October 2024, within the CRB Sendjas (Chlef) club, category (U17) playing in the Blida Regional Football Tournament

2- Protocol:

We proposed an abbreviated method of play.

of 3c3: set up 72h after a match, with a standardized warm-up of 25':

- moderate pace 6'
- 4' athletic ranges
- 2' stretch
- technical heating (pass/ control)
- Dueling exercises 2'
- 2.30' active-dynamic stretching
- reduced play 3c3 (2' w/2' recovery), total (w) =24
- 19 x 20 m pitch (380)/ 85 per player
- Three balls at most
- Minimise spikes and protect the ball
- NB Acceleration/Deceleration

In order to better evaluate our training programme we used physical tests:

- CMJ jumping motion knowledge test: Using the My Jump 2 app.

- Using GPS cardio to quantitatively/quantitatively monitor the load of the game

Given the lack of this material and its use, we have chosen to base on other approaches and by conducting other tests.

Due to the lack of availability and use of this material, we chose to rely on other approaches and perform other tests.

By setting up a CMJ test before the protocol and another test 24 hours after the end of the protocol. To better quantify effort, we relied on Foster's RPE index in

2001, where each player was asked to perceive a sense of internal effort (Toumi and Ghenam, 2020).

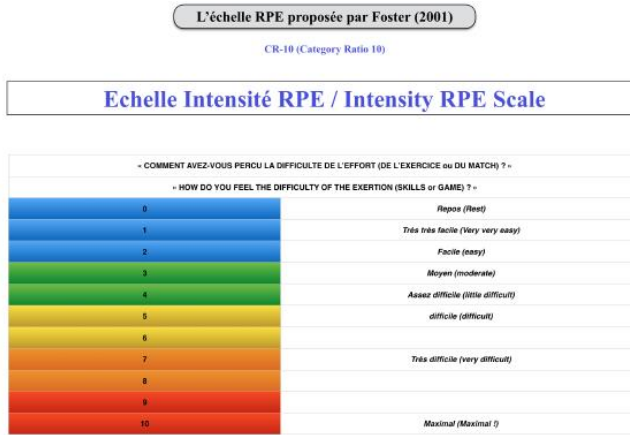


Figure N°1: RPE scale /Source: Foster (2001)

3- Statistical tools:

*Average:

$$\bar{x} = \frac{1}{n} \sum_{i=1}^n x_i$$

*Standard Deviation:

$$s = \sqrt{\frac{\sum (x - \bar{x})^2}{n}}$$

*T-Test for independent samples:

$$t = \frac{m_A - m_B}{\sqrt{\frac{s_A^2}{n_A} + \frac{s_B^2}{n_B}}}$$

We used IBM-SPSS V.24 software for statistical data processing.

III- Result:

- Presentation and analysis of results:

For this study we have a group of 24 players, 12 U17 players with an average age of 16.15 years 0.55, height 172.98 cm 7.42 cm, weight 61.85 kg 2.98 kg and BMI 19.85, and 12 U16 players with an average age of 15.67 years 0.52, height

***effect of small sided 3Vs3 playing exercise on CMJ performance
for U17 football Players***

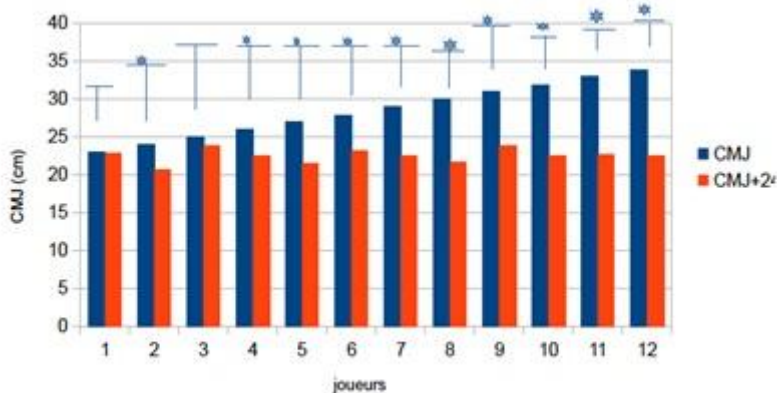
170.88 cm 6.50 cm, weight 62 kg 2.87 kg and BMI 18.94 kg/m², advanced in the league championship. Participated in all pre-participation assessments tests proposed as part of our study protocol, with a randomized passage.

MCJ (cm)	Average	Standard Deviation	T Calculated	T Table	Sig
CMJ pre	22,98	0,79	2,42	1,79	Signific-ative
CMI 24H	22,58	0,90			
RPE	5,41	EC			
			EC = 5.41 X 24 = 129.84 AU		

Table N°1: U18 CMI test result

In Table 1, the results of the pre-test and post-test of the amplitude index test for the U17 group are shown. The amplitude index obtained is (-0.67), which indicates a decrease in the group's performance. This deterioration can be considered moderate because the index should be between (-0.6) and (-1.2). We also observe the results of the (t) test, noting that the experimental (t) is higher than the theoretical (t), which means that the differences are statistically significant.

Figure N° 2: Test CMJ groupe U17



We observe in Figure 2 a deterioration in performance for most of the players, significantly after the training programme, attributed to the training load of this group.

CMJ (cm)	Average	Standard Deviation	T Calculated	T Table	Sig
CMJ pre	23,55	22,58	3,98	1,79	Signific-ative
CMI 24H	2,61	2,44			
RPE	5,25	EC			
EC = 5.25X 24 = 126 AU					

Table 2: Table showing the results of the U16 CMI test

The amplitude index obtained is (-0.38), which shows a decrease in the performance of the group. This means that the differences are statistically significant.

Figure N° 3: Test CMJ groupe U16

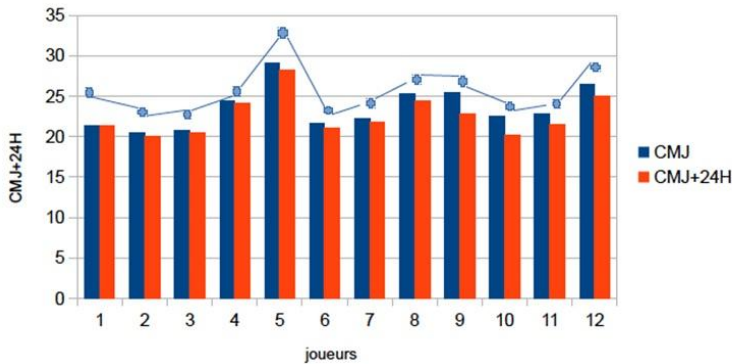


Figure N° 3: Test CMJ groupe U16

IV –Discussion:

After verification and parameterization of each type of contextualized exercise, the object of our work was the optimization of these situations with the ball. 24 regional level players participated in all the randomized entry-exit evaluation tests as well as the training protocol. Divided into 2 groups U17 (n = 12) and U16 (n = 12) with respective ages of 16.08 ± 0.5 years and 15.33 ± 0.49 years. Homogeneous in terms of height ($D = 1.92 \pm 0.48$ cm), weight ($D = 0.23 \pm 0.8$ Kg) and BMI ($D = 0.73 \pm 0.97$). They all performed a CMJ before the protocol and a second CMJ 24 hours after the latter. We proposed a reduced 3vs3 game on a space of 20 x 19 m (380 m²) / 94 m² game density per player, with 1 min of work and 2 min of recovery over a period of 24 min.

The rules were a maximum of 3 touches of the ball, minimising passing angles, keeping the ball and being dedicated to retrieving the ball. These games were played 72 hours after a championship game, and a 25-minute warm-up was initiated.

effect of small sided 3Vs3 playing exercise on CMJ performance for U17 football Players

CMJ results showed significant differences before and after the training programme.

The performance index shows a slight deterioration for the U16 compared to an average deterioration of it for the 17

The dominant force is the equivalent of a field density of $104 \pm 13 \text{ m}^2$ per player (Nick Broad model), this confirms the effect of our type of games on the neuromuscular level.

V –Conclusion:

So we can say that training with a contextualized 3vs3 game, on a field of 380 m^2 and a density of 94 m^2 , it replaces ball-less (analytical) training with training using mini-games.

In addition, and as a practical application for the exerciser:

- Focusing on the total workload determined by the coach, the perceived (delayed) fatigue at the muscular level can be more important after the deterioration of play.
- Quantitative measurement of CMJ using the RPE method does not allow for discrimination of the cost to efforts at several levels of intensity.
- this observation leads the coach to have to carefully manage the intensity of the contextualized exercises during his session, in order to leave enough time for the players to recover well on the muscular level and thus control the potential risks of fatigue or injury.

IV –References:

- Bangsbo J., Norregaard L., Thorsoe F. (1991). Activité profile of compétition soccer, Canadian Journal of Sports Sciences, 16, 2, 110-116.
- Casamichana, David ,Castellano ,Julen ,Castagna ,Carlo.(2012).comparing the Physical Demands of friendly Matches and small sided games in semi fissionnal soccer player. Journal of Strenght Conditioning Research. 26(3):837-43.doi: .1519/JSC.0b013e31822a61cf.
- Dellal, A. (2011). Comparison of physical and technical performance in European professional soccer match-play: the FA Premier League and La LIGA. Our J Sport Sci AA(2): 51-59
- Dellal A.(2008). Analyse de l'activité physique du footballeur et de ses conséquences dans l'orientation de l'entraînement : Applications spécifiques aux exercices intermittents courses à haute intensité et aux jeux réduits. Thèse de Doctorat .Université de Strasbourg.
- Dellal,A. (2016). Une saison de préparation physique en football. De Boeck supérieur, 1-15
- Bangsbo J. (1994). The physiologie of soccer : with spécial référence to intense intermittent exercice. Acta Physiologica Scandinavia, 15, 619, 1-15.

- Ghoual, A, and Bengoua, A. (2015). L'apport de la préparation physique intégrée à l'entraînement en football des jeunes footballeurs algériens u-17 (les qualités physiques et techniques combinées). *Revue des Sciences et Technologie Des Activités Physique et Sportive*, 12(12), 11-27.
- Hadj.A.M. (2016).document pédagogique, université Akli Mhand Oulhadj,Bouira.
- Hamek, B., Bengoua, A., et Remaoun, M. (2018). L'influence de la préparation physique par la méthode de compétition sur la forme physique en football, *Revue des Sciences et Technologie Des Activités Physique et Sportive*, Numéro spécial: du 8ème colloque international : sciences des activités physiques et sportives et les défis du troisième millénaire.
- Hourcade,A. . (2019).les 5piliers de la preparation physique,Ebook,Acpasport.
- Jean.M.B ,et Hansruedi.H(2016),fifa youth football,www.fifa.com.
- Julien, B.,Nicolas, B.(2017).Impact du jeu-réduit sur les sollicitation énergétiques, cardiaques et musculaires du joueur de football :centre d'expertise et de performances .dijon .
- Rampinini, E, Impellizzeri, F. M., Castagna, C., Coutts, A. J., et Wisløff, U. (2009). Technical performance during soccer matches of the Italian Serie A league: Effect of fatigue and competitive level. *Journal of Science and Medicine in Sport*, 12, 227-233.
- Owen, Walker. (2016, 10, July). "Calculating CMJ Performance". *Science for Sport Journal*. 32(02). Pages 131-137.
- Stolen,T,. k,Chamari.,C,Castagna.,U,Wisloff. (2005). Physiology of soccer. an update, *Sports Med* 35(6):501-36. doi: 10.2165/00007256-200535060-00004.

How to cite this article according to the APA method:

Abderrezak BOUDOUANI, (2025), Effect of small sided 3V3 playing exercise on CMJ performance for U17 football Players, **International Journal of Studies & Research in Sport Sciences & Training**, Vol : 06 / N°: 01 (2025), p 22–30.