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Entrenamiento con TRX para incrementar la velocidad en jugadores de béisbol categoría juvenil de Matanzas

Training with TRX to increase speed in youth baseball players in Matanzas

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RESUMEN

El entrenamiento en suspensión con el TRX se ha convertido en uno de los sistemas de entrenamiento funcional más difundido por su efectividad y versatilidad. En esta investigación se diseña un entrenamiento funcional con TRX para el incremento de la velocidad en el corrido home-primera base de los jugadores de béisbol categoría juvenil de Matanzas. Se obtiene, que este programa de entrenamiento planificado en quince semanas, con tres frecuencias semanales, logra cambios significativos en los tiempos de la carrera de home-primera base, con un 4,37% de incremento, siendo los jardineros y los zurdos los jugadores con mayor efectividad.

Palabras clave: Entrenamiento en suspensión con TRX; Béisbol; Corrido de home-primera base; Velocidad; Fuerza; Entrenamiento funcional

ABSTRACT

Suspension training with the TRX has become one of the most widely used functional training systems due to its effectiveness and versatility. In this research, a functional training with TRX was designed in order to increase the speed when covering the home-first base race for junior category baseball players from

Matanzas. As a result, this training program, planned 3 times weekly for a period of 15 weeks, allows an increase of 4,37% of speed of the center field players and left-handed players with greater effectiveness. This research makes possible to achieve significant changes concerning race times.

Keywords: Suspension training with TRX; Baseball; Home-first base race; Speed; Strength; Functional training

INTRODUCTION

In recent years the name of suspension training with TRX has emerged. This type of training, in parallel with the development of muscle strength, provides improvements in the flexibility, balance and stability of the central part of the body, as required in different sports disciplines. To this is added that facilitates teaching-learning processes and the improvement of motor actions. In addition to the increases in the development of motor skills, a complete transfer is obtained to the sport that is being trained, provided that an adequate mastery of the same is achieved (Maglischo, E. 2009).

This type of suspension training with the TRX has become one of the most widespread functional systems. Its effectiveness and versatility, as a tool for suspension training has led to its incorporation into the training programs of the most important professional sports teams in the US - National Football League (NFL), the National Basketball Association (NBA), the National Hockey League (NHL) and Major League Baseball (MLB).

Suspension training quickly became the main basis of the strength and conditioning routines of professional baseball players, due to the wide range of movements and exercises performed by holding both the lower and upper limbs by a single point support, providing an ideal combination of support and mobility to develop strength, endurance, coordination, flexibility, power and stability of the central part and with a wide choice of resistance, while the opposite end of the body is in contact with the ground (Barrett, S. 2016).

This system of suspension training consists of the fact that the force is exerted by the load of one's own body weight, without the need to use another additional load,

as far as the harnesses can be attached to the hands or feet, depending on the exercise that is carried out. Referring to physiological and biomechanical parameters of the specific sport or to a motor skill, the exercises should imitate the angle of the skill practiced (Bompa, T. and Buzzichelli, C. 2016).

In practice, functional training causes instability at the level of the members, both upper and lower, caused by the point of grip / support of the hanging bands, the degree of difficulty being determined by the inclination of the body with respect to the floor and the placement of the center of gravity (CDG), inside or outside the body balance line.

The greater the instability, the lower the capacity to generate force, and for this the player must have adequate levels of strength of the stabilizers of the spine, as well as an adequate conditioning of the muscles of the forearms and legs, given the great implication that entails the realization of any exercise with TRX tapes. The use of this type of exercise is beneficial in the training of baseball players, and its use to exercises with overloads, this considering the constant grip with balls, bats and races among bases at different distances and situations that characterize this athletic discipline.

These are the premises that have stimulated the authors to achieve the design of a functional training with TRX to increase the speed in the home-first base run of baseball players youth category of Matanzas.

METHODS

The study is experimental (pre-experiment). The sampling was non-probabilistic for convenience, being chosen intentionally the 18 players of the juvenile category of the Matanzas team that participated in the XLVI National Baseball Championship that constitutes 100% of this population. The research is of transversal type and included the preparatory period, which consisted of 15 microcycles of duration, with three weekly frequencies, using suspension training to stimulate the motor aspects, adjusting to different environments, to achieve a full transfer when it is achieved an adequate mastery of them. The interaction of different muscles is encouraged, in dynamic and static forms (Manzano, B.L. 2011). These adjustments with the

purpose of provoking an increase in the speed of the home-first base race in the baseball players, and combining criteria of the periodization models of the force (Bompa, T and Buzzichelli, C. 2016); of the Block System or Concentrated Force (Verjoshansky, Y. 2017).

The subjects were measured three times, start and end of the general preparation stage and at the end of the special preparation stage. The test used was the home-first-base speed, and was carried out using a CASIO electronic chronometer with an accuracy of 0.1 hundredths of seconds, located with the controller at the level of the first base. It is activated when the player makes contact with the ball and stops when the first base is stepped on (Reynaldo Balbuena, F. 2017).

We must highlight the use of scientific research methods, from the empirical level, which included the review of documents, observation and test or measurement. In the data processing the STATGRAPHICS PLUS Version 5.1 statistical package was used, specifically in the comparison of means with a level of significance equal to 0.05, to determine the existence or not of significant differences in the results for the factors studied, through a multivariate analysis of variance.

The factors are: the controls carried out (three), the hand with which the players batter (rights and lefties) and the position in the field of play (fielders, infielders and receivers). The effectiveness of the home-first base race of the Matanzas youth baseball team players is calculated from the percentage increase (% Incrt) Guzhalovkij (García, A., Carreño, J.E., Ruiz, J.M., and García, A. 2017) , based on the following equation: $\% \text{ Incrt} = ((X_2-X_1))/(X_2+X_1)*100)$.

Functional training is a different way of training, because this type of training manages his charges with the self-same corporal weight (Kosmata, A. 2014). The TRX system involves the use of your body weight as resistance, challenging and working balance, strength and agility.

Suspension training has two essential components for its execution; the first is in the simple forms of static positions, which are known because no movement of the joints occurs, nor actions of levers; stating that in this way the muscle expresses certain tensions; while the other form of exercise allows the variety of movements

without maximum load increases, but variations of positions of the joints and postures (Manzano, B.L. 2013).

The TRX in athletes allows the development of muscular resistance. Being able to stand out like a suitable form for the training, as it is demanded in any sport activity. Functional training can generate an improvement in speed; as well as greater stability and coordination, this type of training being an alternative for improving performance and preventing injuries.

The extensive collection of exercises with the TRX, makes this resource an effective and versatile solution for training, regardless of the level of physical condition of the athlete. Suspension exercises can be modified to design training programs.

Specific strength training with TRX is achieved by exercises that reproduce the action of the kinematic chains employed in specific motor skills, including complete mobility and the force vector of specific joints. Special emphasis is placed on antagonistic muscles, without altering the motor patterns necessary for the sport technique (Bompa, T. and Buzzichelli, C. 2016). This type of training within competitive sport makes a clearer reference to the specificity of the task with the aim of training the neural pathway, improving inter and intramuscular coordination through nervous mechanisms for the improvement of strength.

The TRX is adapted to specialties such as baseball, where maximum use of motor skills is required (strength, speed, coordination with explosive and powerful gestures with constant accelerations and decelerations). Also, the different types of exercises allow working in the frontal, sagittal and transversal planes, where these abilities are determinant for the recognition of movements and the perception of their body in space. Developing muscle endurance, activity of deep muscles and postural muscles (Dulceata, V. 2013).

Therefore, it can be talked about suspension training as a tool that allows to increase the stimulus of an exercise to facilitate it, when introducing it in progressions of exercises for the unstable situations with respect to the same exercise in a stable situation in the cases that stated progression is advisable.

Facilitating the execution of specific strength exercises, especially the lower train and traction elements or oars.

The realization of these specific strength exercises with TRX to improve speed in the home-first base run, allows players the full range of the lower limbs, achieving the interaction of different muscles, in dynamic and static forms.

Below are the variants of exercises performed for the upper limbs (figures 1 and 2), variants for the lower limbs (figures 3 and 4), the combination for the lower and upper limbs (figure 5), plyometric jumps and special exercises of speed (figures 6 and 7); as well as methodological indications to be observed during the realization of the same.

Variation of exercises for the superior members.

Figure 1. Chest Press and Arm Flexion (Biceps)

Figure 2. Extension of arms (triceps), Rowing and Flexion and extension of arms (plates)

Variation of exercises for the lower limbs.

Figure 3. Squat with one leg and Scissors in front.

Figure 4. Scissors with vertical take-off of the support leg and Scissors with jump to the drawer of the supporting leg.

Combined exercises for the lower and upper limbs.

Figure 5. Flexion and extension of legs and arms, Flexion and extension of the legs alternately with flexion of arms, Flexion and extension of legs with lateral turns and flexion of arms.

At the end of the training sessions in suspension with TRX, plyometric jumps and special exercises of high speed of execution will be carried out, to favor the mixed or combined convergence phase and maintenance of the power throughout the preparation period. Based on the criteria of Zarza, J. (2014), each time these specific sports gestures are repeated, a greater development of the control of their biomechanics is achieved, which will allow them to act in a more efficient manner in the face of the different situations that may arise.

With this purpose, specific training oriented towards explosive force was used (Verjoshansky, Y. 2016), with moderate-high intensity plyometric exercises (figure 6), using heights between 0.70-0.80 meters. With an obstacle making boat jumps and bouncing with a flexion and extension of the lower limbs of the body very quickly, reducing the contact time of the same with the ground during the jump and perform between 70-80 repetitions at the end of each training session.

Figure 6. Plyometric jumps.

The special speed exercises (figure 7), should always be executed with high intensities close to the maximum from 80-90% up to 100%. Attention should be directed towards the technique of the subsequent takeoff and the contact form of the standing with the ground, as well as the general work of the body in the interaction with the support, insisting on the elevation of the leg in the previous step and extension of the takeoff leg (García, A., and Cortegaza, L. 2014).

The number of repetitions of the continuous cyclic exercises should be such that they are always performed without decreasing the speed, usually 15-20. Recovery pauses must be performed passively with sufficient time to allow full recovery for the next repetition (García, A., Carreño, J.E., Ruiz, J.M., and García, A. 2017).

Figure 7. Special exercises for the speed race.

RESULTS

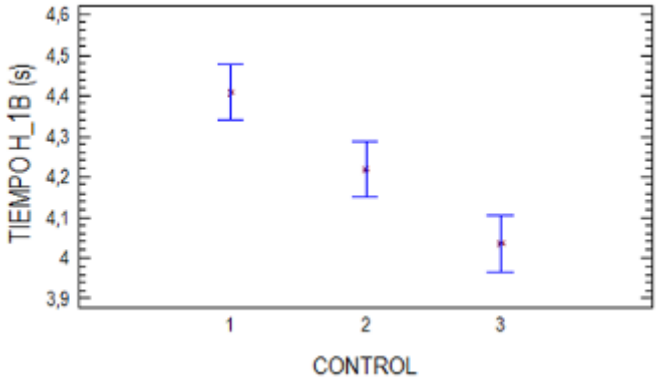
In the course of the preparation stage where the specific sequence of strength training phases are framed, three controls were carried out in the home-first base run, showing a substantial improvement in the results, with the decrease of times.

Table 1. Results of multivariate variance analysis for home-first-run time.

Efect	Calculated fisher	Tabulated fisher	Value of the probability
Control	27,67	3,19	0,0000
Hand hitting	13,86	4,04	0,0005
Position	12,14	3,19	0,0001

The three factors studied exert a significant influence on the home-first base run time for 95% confidence, since the probability values are lower than 5%, and the Fisher calculated is greater than the tabulated one. When these results are plotted (figure 8) it is observed that in the course of the preparation stage where the specific sequence of phases of the strength training is framed, in which the three controls of the home-first base run were made, an increase of 4.37% increase, which shows the effectiveness of the program, with a decrease of 0.37 seconds.

Figure 8. Behavior of the home-first base run time in the three performed controls.



When considering the analysis of the effectiveness of the functional training program with TRX, taking into account the hand with which it is batted and the position in the field of play. In the first case, it is observed that the left-handed players demonstrate better effectiveness in the home-first base run than the rights, with a 2.25% increase; while the players who work as gardeners denote the best results, followed by the checkers and finally the receivers, with the % increase in effectiveness between the first and second of 1.81%; while respect to third parties becomes of 3.44%.

Figure 9. Behavior of home-first base run time according to the batting hand.

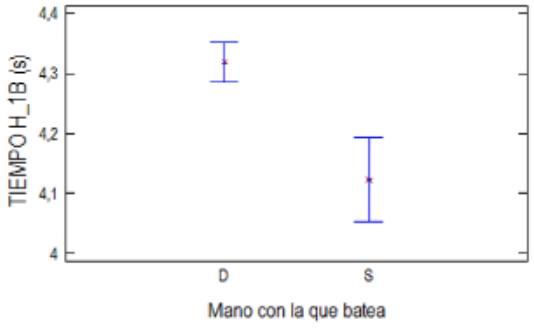
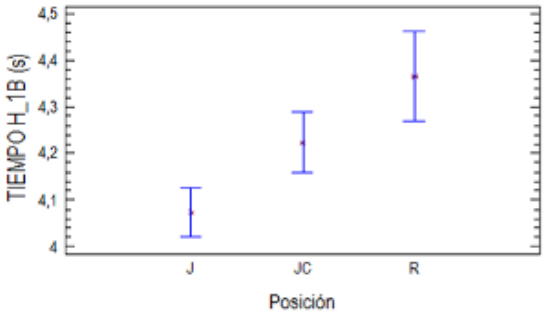


Figure 10. Behavior of home-first base run time by position in the field of play.



DISCUSSION

The findings of this research agree with what has been described by the majority of the studies referred to this subject, and in particular with the results obtained by Barrett, S. (2016). This author states that functional training with TRX is designed to generate a more difficult environment in order to increase the participation of small and deeper muscles. Also, Adalid, J. (2014), applying exercises with TRX during the competitive level, showed a remarkable improvement in the proprioception and balance of the lower train.

In other researches carried out by Manzano, B.L. (2013), the importance and benefits of TRX functional training in athletes could be demonstrated, where strength, flexibility work and functional action of the deeper and stabilizing musculature are directly involved, besides of being a method to improve quickly and safely the physical condition.

The study conducted on functional training in young people and subjects previously trained by Tomljanović, M., Spasić, M., Gabrilo, G., Uljević, O., and Foretić, N. (2011), to determine the effects on strength and agility, implementing a training program of three sessions (functional training), and another traditional training per week, during a month and a half, significantly influenced the agility variables. The results showed that traditional training increased power qualities, while functional training improved postural control and precise coordination.

In response to these evidences that demonstrate the effects and importance, both physically and of sports performance, we can observe the relevance of functional training with this study where the level of competitions during the regular season will be high, and rest is very short.

With TRX there has been the opportunity to develop, create its own exercises depending on the level of the athlete´s training, gradually increasing the difficulty and complexity of the same, to favor the improvement of strength, speed, coordination, balance and reaction times (Barrett, S. 2016). Under the observation of the basic principles of progression with TRX: from the easy to the difficult, from the simple to the complex and from the known to the unknown.

The theoretical and practical information provided by this training would be beneficial for athletes, since one of the characteristics that favor the improvement of athletic performance is a balance of their physical abilities.

The results of the present study indicate that the incorporation of the functional training with TRX, the work of compensatory force for the development of the power through the plyometric jumps and special exercises for the speed, allows the obtaining of significant effects in the reduction of the times of the home-first base race of baseball players youth category of Matanzas. Allowing them to reach an

optimal level for these players to face the competition at a stable pace and get the best results for the team.

The results obtained with this study admits that a TRX training program with a duration of fifteen weeks and three frequencies for each one of them, leads to significant changes (probability values lower than 5% are obtained by the three factors studied and the calculated Fisher is greater than the tabulated one) in the times of the home-first base race of the youth baseball players of Matanzas, with a 4.37% increase. The most effective players are gardeners and left-handed hitters, which suggests that the TRX functional training programs can be implemented to improve the speed of the home-first base run and at the same time prevent injury possibilities.

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