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Weekly planning program for the development of strength in female judo athletes of the 9-10 years old category

Programa de planificación semanal para el desarrollo de la fuerza en judocas de la categoría 9-10 años

Programa semanal de planeamento para o desenvolvimento da força nos judocas da categoria dos 9-10 anos de idade

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ABSTRACT

The present work consisted in the elaboration of a weekly planning program for the development of strength in judo female athletes of the 9-10 years old category. Its essential purpose was to offer a way to positively influence the performance of judo



female athletes belonging to this age group, at the same time that a new resource is available to elaborate the planning of strength for this sport discipline, which also contributes to the process of improvement of sports teachers who work in the basic link. For this purpose, the morpho-biomechanical fundamentals of strength exercises were taken into account, as well as the morpho-functional characteristics of the children who belong to it. To obtain information, document review, survey and observation were used as methods. Since no references were found in the specialized bibliography that was consulted, as well as the lack of evidence of a weekly planning of strength training, based on the aforementioned parameters, which could be verified through the diagnosis carried out, the authors were able to design a weekly planning program for the development of strength in judo female athletes of the 9-10 years old category, according to the physiological demands of this age group. In this way, it was possible to have a positive influence on the development of this motor capacity, without harming the organism of these children.

Keywords: strength; morpho-biomechanical fundamentals of strength; category 9-10 years old.

RESUMEN

El presente trabajo consistió en la elaboración de un programa de planificación semanal para el desarrollo de la fuerza en judocas de la categoría 9-10 años. El mismo tuvo como propósito esencial, ofertar una vía para influir positivamente en el rendimiento de los judocas pertenecientes a este grupo etario, a la vez que se dispone de un nuevo recurso para elaborar la planificación de la fuerza para esta disciplina deportiva, con lo que se contribuye, además, con el proceso de superación de los profesores deportivos que laboran en el eslabón de base. Para ello, se tuvieron en cuenta los fundamentos morfo-biomecánicos de los ejercicios de fuerza, así como las características morfo-funcionales de los niños que pertenecen a la misma. Para la obtención de información, se utilizaron como métodos la revisión de documentos, la encuesta y la observación. Al no encontrarse referentes al respecto en la bibliografía especializada que fue consultada, así como la falta de evidencia de una planificación semanal del entrenamiento de la fuerza, sustentado en los parámetros anteriormente mencionados, lo que pudo constatarse a través del diagnóstico efectuado, los autores lograron diseñar un programa de planificación semanal para el desarrollo de la fuerza en judocas de la categoría 9-10 años, acorde con las exigencias fisiológicas de este grupo etario. De este modo, se pudo influir de forma positiva en el desarrollo de esta capacidad motora, sin daños para el organismo de estos niños.

Palabras clave: fuerza, fundamentos morfo-biomecánicos de la fuerza, categoría 9-10 años.

RESUMO

O presente trabalho consistiu na elaboração de um programa de planeamento semanal para o desenvolvimento da força nos judocas da categoria dos 9-10 anos de idade. O seu objectivo essencial era oferecer uma forma de influenciar positivamente o desempenho dos judocas pertencentes a esta faixa etária, tendo ao mesmo tempo um novo recurso para desenvolver o planeamento de força para esta disciplina desportiva, o que também contribui para o processo de melhoria dos professores de desporto que trabalham no elo básico. Para tal, foram tidos em conta os fundamentos morfo-biomecânicos dos exercícios de força, bem como as características morfofuncionais das crianças que a ela pertencem. A fim de obter informações, foram utilizados como



métodos a revisão, o levantamento e a observação de documentos. Uma vez que não foram encontradas referências na bibliografia especializada que foi consultada, bem como a falta de provas de um planejamento semanal do treino de força, baseado nos parâmetros acima mencionados, que pôde ser verificado através do diagnóstico efetuado, os autores puderam conceber um programa de planejamento semanal para o desenvolvimento da força nos jogadores de judô da categoria dos 9-10 anos, de acordo com as exigências fisiológicas desta faixa etária. Desta forma, foi possível influenciar positivamente o desenvolvimento desta capacidade motora, sem danificar o corpo destas crianças.

Palavras-chave: Força; Fundamentos morfo-biomecânicos de força.

INTRODUCTION

In judo combat, according to Espinosa Mildestein, M., Santana Lugones, J. L. and González Pascual, J. A. (2019), the offensive and defensive actions that occur during the initiation stage have certain characteristics that have a great influence on the organization of the technical-tactical preparation of the judoka, which stimulate the search for methodologies different from the traditional ones regarding the systematization of the contents for their teaching.

Authors such as León, L. L. L., León, L. R. and Cáceres, Y. (2018) recognize the importance of conceiving the judoka's initiation process in two major stages: (Basic formation and technical teaching) posing that in this way it will be achieved to dose the tasks in a more affordable way, all on the basis of the budgets of sports initiation.

Accordingly, the methodologies to achieve these goals should take into account the demands of combat, conditioned by the various external and internal factors that modify the competitive actions of judo fighters in the initiation stage. Among the external demands are the limits of the competition area and the regulations, while the internal ones include the development of the physical fitness capacities that determine and condition sports performance in relation to the individual characteristics of the athlete (Espinosa Mildestein, M., Santana Lugones, J. L. y González Pascual, J. A.; 2019).

Strength is one of the motor capacities that has the greatest influence on the others. In this regard, Bompa states that "when an athlete develops his strength, he experiences a positive transfer to speed and endurance" (Bompa, 2006).

In the literature consulted, various definitions of strength from different points of view were also found. Armas (2018) considers that it is "the capacity of the human body to overcome or counteract endurance through muscular activity".

Caravaca, V. (2018) considers it as "the capacity to overcome an external endurance or react against it by means of muscular tension in a static or dynamic manner".

Strength as a motor capacity of man can be seen as "his capacity to overcome or counteract an endurance by means of muscular activity" (Platonov and Bulatova, 2017).

According to Salas, E. G. and *et al.*, (2020) to achieve sports results in judo, it is required a correct training planning regarding strength.



That is to say, high levels of strength allow the body structure to move in space more easily, making motor actions more efficient, whether from an analysis based on speed or agility. On the other hand, strength reduces the influence of the external environment, which also has a direct impact on the maintenance of motor actions, thus contributing to endurance.

Other criteria that support the influence of strength on athletic performance argue that the increase in speed from home to first base, shown by baseball players, has had a marked interconnection with the development of strength (García, *et. al.*, 2017), as well as that plyometric exercises (strength exercises) allow athletes to control the body, balance and move quickly (Chu and Myer, 2016).

This motor capacity presents several functional directions such as: maximum strength, rapid strength and strength endurance. In the case of sports initiation, maximum strength is excluded due to the excessive tension that this type of strength produces on the locomotor apparatus, which can cause injuries and certain deformities in it, due to its great plasticity, typical of these ages.

The rapid strength and the endurance of the strength do not generate a very high tension in the osteo-muscular insertion points, but they can cause a notorious physiological stress. That is to say, exercises executed with a high speed of movement, such as those required for the development of rapid strength, produce a high demand on neuromuscular coordination. Although this type of work can be too stressful for a developing and therefore sensitive nervous system, deformation of the exercises is also possible, conditioned by the speed of execution.

On the other hand, training for the development of strength endurance requires that recovery between rest intervals be rigid, which also represents a physiological overstrain on the child's cardiovascular and muscular system. However, making sure that all body segments, including the different chains of muscular action, receive basic strength training, i.e., that which is represented by multilateral exercises through games or locomotor actions, with the required intensity and recovery, constitutes the guide for planning the training of this motor capacity for the 9-10 years old category. Authors such as Mesa Peñalver, J. and Becali Garrido, A. (2017), publish their Comprehensive Athlete Preparation Program (Pipd) where, in the contents for general and special physical preparation for the 11-12 years old category, they guide the development of rapid strength, explosive strength, endurance to strength, endurance to speed, reaction speed, speed of movement and short, medium and long duration endurance.

Authors such as Espinosa Mildestein, M., Santana Lugones, J. L. and González Pascual, J. A. (2019) assume as fundamental physical capacities to be developed in the initiation stage of the judoka, rapid strength, explosive strength, endurance to strength, aerobic endurance, speed of motor action and complex reaction speed. These authors also clarify that, although the development of strength is still insufficient and is not characteristic in judo fights, the development of strength is still insufficient and it is not characteristic in the fights of this category, most of the actions performed, both offensive and defensive, are elements where strength and speed are expressed, integrating both capacities in the execution of judo techniques.

Most of the actions performed during combat, with a few exceptions, are classified as fast strength events.



It should be clear that, in this competitive category, the most important thing is the motor learning and the integral development of the basic motor capacities, instead of the competitive performance itself.

Regardless of the importance of conceiving muscular strength from this perspective for the category in question in preliminary research, an imprecise planning of this capacity has been detected in judo female athletes of the 9-10 years old category, which negatively influences the effectiveness during the execution of the different technical elements, corresponding to the program of this category.

This situation leads to the formulation of the following scientific problem: How to develop strength in judo female athletes of the 9-10 years old category? In relation to the stated problem, the objective is established as follows: to elaborate a weekly planning program for the development of strength in judo female athletes of the 9-10 years old category.

In this way, a better theoretical-methodological orientation of the sports teachers who work in the basic link is achieved, which makes it feasible for them to fulfill their social task more efficiently.

MATERIALS AND METHODS

For this purpose, a non-probabilistic sample was used, represented by the 16 teachers who teach judo in the 9-10 years old category, in the province of Matanzas. The teachers surveyed constituted 100% of the population, while 10 of them were randomly selected for the observation of two of their classes in which the physical objective was the development of strength. In the selection of the teachers, the Tombola procedure was used.

Theoretical and empirical methods were used in the research; among the first ones, the analytical-synthetic (which made it possible to base the problem on the basis of the bibliographical review carried out), inductive-deductive (which made it possible to formulate the problem and establish links between the different factors analyzed and the conclusions of the research), historical-logical (it allowed verifying the presence of antecedents related to the selection of games and locomotor actions for the development of strength, based on the morpho-biomechanical foundations of strength exercises) and systemic-structural-functional (used to determine the type of exercise selected for strength training and its relationship with the morpho-functional characteristics of the category under study). The second included the analysis of documents (it was directed towards the official documentation of the sports teachers, specifically their weekly and daily planning, as well as the integral program of preparation of the athlete and the teaching program), the survey (it allowed obtaining information about the frequency of strength work and checking if the morpho-biomechanical fundamentals were taken into account during the selection of the exercises) and observation (this was carried out in 20 classes whose physical objective was the development of strength). The parameters to be observed were the following:

- Types of strength to work.
- Exercises selected for strength work.
- Muscle action chains included in the selected exercises.



- Adequate muscular balance between the chains of muscular action involved.
- Relationship between work and rest according to the type of strength to be worked.
- Adequacy of the selected methods.
- Order of execution of the exercises according to the type of strength to be worked.
- Organizational procedures used for the strength exercises.

The dimensions and indicators included the following:

Dimension: content of strength training.

Indicators:

- Types of strength to develop in this age group.
- Exercises for the development of different types of strength.

Dimension: dosage of strength training.

Indicators:

- Weekly frequency of strength training.
- Number of sets and repetitions per exercise, considering the type of strength to be worked.
- Recovery time among sets.
- Intensity of the exercises according to the type of strength to be worked.

Dimension: organización del entrenamiento de la fuerza.

Indicators:

- Order of execution of the strength exercises with respect to the technical content and with respect to the physiological differences of the types of strength to be worked.
- Training method for each strength exercise.
- Organizational procedure for each strength exercise.

In processing the data, we used the percentage significance table "Excel Sheet for Calculating the Critical Points of the Binomial Distribution" in which the data are calculated in EXCEL with the algorithm of J. Bukacè, Critical Values of the Sign Test. Algorithm AS 85. Applied Statistics. V 24. N 2. For which, the values are: 01 very significant, 05 significant and 1 insignificant.



Morpho-biomechanical fundamentals of strength exercises

Physical exercises are voluntary motor acts that are performed to fulfill the different tasks of sport and Physical Education. In the specialized literature, physical exercise is recognized as a motor act, that is, as a way of manifesting the movement of the locomotor apparatus. For this reason, the anatomical fundamentals that determine the agonist muscular work of the different movements of the body are the same that must be considered to determine the protagonist muscular work during the performance of strength exercises.

Strength exercises are divided into arm exercises, trunk exercises and leg exercises. Arm exercises are performed through movements of the upper limb to strengthen the thorax (pectoral and dorsal regions), shoulders, arms and forearms. Trunk exercises are performed through movements of this body sector for the development of the ventral and lumbar regions. Leg exercises are performed through movements of the lower limb to strengthen the pelvis, thighs and legs.

However, during strength work during the sports initiation stage and, specifically, within the 9-10 years old category, localized gymnastics work has a limited use. Instead, locomotor games or actions that have an integrative character, while not generating a marked physiological stress on certain osteo-muscular junction points, are recommended. However, the selection of these exercises should be based on the muscular work involved and not chosen randomly.

Another important element within the physical preparation in the sports initiation stage is the general character of the exercises, which consolidates the basis for a motor specialization work in the future. In this regard, Verjoshansky expressed: "At the beginning, the means (physical exercise) of physical preparation should develop motor capacities separately. Later they are integrated on the basis of sports movements that are similar to them from the structural point of view.

Based on these approaches and the results obtained through the diagnosis, it is that the discussion on the issue in question was conceived.

RESULTS Y DISCUSSION

Diagnosis planning

The diagnosis was carried out by applying various instruments to obtain and process the required information. The procedure followed was as follows:

1. Bibliographic review and analysis of the documents available to teachers for physical preparation planning.
2. Survey of teachers.
3. Classroom observation.

The parameters considered for the diagnosis were associated with the dimensions and their indicators (content, dosage and organization). The first refers to the type of exercise; the second is reflected in the weekly frequency, volume and intensity of the



exercises to be performed; while the third is the part in charge of the order, the selection of methods and organizational procedures to be used.

Results of document review

During the review of the Comprehensive Judo Athlete Preparation Program (2017-2020), the Teaching Program, as well as the weekly plans and daily classes of the teachers, it could be seen that the frequency of strength work is adjusted to the physiological demands of the category in question. However, the following insufficiencies appear:

- Exercises for the different types of strength are not indicated.
- The number of sets and repetitions with which the exercises should be performed for the development of the different types of strength is not indicated.
- The recovery time between sets of exercises for the development of the different types of strength is not indicated.
- The order, methods and organizational procedures to perform the strength exercises are not oriented or recommended.
- A combination of exercises based on games or locomotor actions (according to this age group), which could guarantee a multilateral work of strength for each session, is not oriented or recommended.

Survey result

The 100 % of the respondents recognize that they do not apply the morpho-biomechanical fundamentals to select the strength exercises for each training session where this motor capacity is treated, which is very significant for the first tail.

The 81 % (significant for the first tail) of the respondents do not prioritize the game and locomotor exercises for the development of strength in students of the 9-10 years old category, they prioritize the localized gymnastic exercises, which produce a high stress in the osteon muscular insertion points in children of these ages.

The 88 % (significant for the first tail) of the respondents do not ensure adequate recovery between sets of exercises for the development of rapid strength.

The 63 % (insignificant for the first tail) of the respondents cannot establish the differences between the physiological influence of the methods for the development of rapid strength and the methods for the development of strength endurance.

Classroom observation results

During the observation of the 20 classrooms visited, the following was observed:

- The combination of exercises per session was not based on a morpho-biomechanical analysis of the strength exercises, as a result of which, in some sessions, the load was too influential on a certain body sector, while in other sessions some of these body segments were overlooked.
- Inadequate balance of the agonist and antagonist muscular work of the trunk.



- Incorrect work-rest relationship among the series of exercises for the development of rapid strength.
- Incorrect ordering between the exercises for the development of fast strength and the exercises for the development of strength endurance.

These results, when methodologically triangulated, allowed us to infer the following as regularities:

Regularities of the first dimension (content)

Consideration of the development of muscular strength is emphasized, but without delimiting which of its manifestations should be emphasized, its development is not indicated for all body segments and the number of exercises is limited, without specifying the functional direction for which they should be planned.

Regularities of the second dimension (dosage)

In this regard, the distribution of the work in the week is distinguished and the global time for it is indicated with the strength, but the time of work and rest is not specified, nor the intensities to be observed.

Regularities of the third dimension (organization)

The absence of explanations on the methods to be used in this work was detected, the games are limited and not very precise in the recommendations for their use, as well as the specific organizational procedures for the work of muscular strength.

Based on the results obtained, the authors make a proposal for weekly planning for the development of muscular strength, as follows:

Weekly planning program for the development of strength in judo female athletes of the 9-10 years old category

In view of the results of the bibliographic review, studies carried out in the practice of initiation sports and the experience accumulated by the authors in the preparation of athletes, the following parameters were considered pertinent for the weekly planning of muscular strength work: weekly frequency, type of exercise, its combination and dosage of the load.

The weekly frequency expresses the number of times the work is repeated within this time. When determining this indicator, possible recovery times after muscular strength work should be considered.

It should be noted that frequency should be considered from two perspectives: global frequency and local frequency. The first of these refers to the number of days per week in which strength exercises will be performed; on the other hand, the second indicates the number of sessions in which a specific body sector will be occupied in the performance of exercises for the development of this motor capacity.

In the literature consulted, there are authors who recommend a frequency in children who are starting strength training of 2-3 sessions per week on non-consecutive days, which will allow adequate recovery between sessions *Peña, G. and et al., (2016)*.



In the case of children aged 9-10 years, they should not perform exercises for each muscle sector more than twice a week, since greater work, regardless of not being necessary, constitutes an excessive load for the child organism. On the other hand, performing strength training in only two days a week for all muscle groups, taking into account, in addition, the different manifestations of strength to be developed by each one of them, results in two days of excessive work. In view of this, it is proposed that the global frequency of strength training should be three times a week, but the local frequency should be only twice a week (Table 1). The recommended combination is shown below:

Table 1. - Overall and local frequency of muscle strength training per week

Lunes	Miércoles	Viernes
Fuerza de brazos	Fuerza de tronco	Fuerza de piernas
Fuerza de tronco	Fuerza de piernas	Fuerza de brazos

The type of strength to be developed responds, first of all, to the competitive demands of the sport, but in the case of sport initiation, biological factors are preponderant when establishing the work to be done (S. Navarro, 2007). In other words, maximum strength is important (although not determinant) for judo, however, due to its physiological demand, it is not advisable to try to develop it in subjects under twelve years of age.

Rapid strength is essential to anticipate the offensive or defensive actions of the opponent to achieve a grip quickly, the recovery of balance in each attack, defensive reactions, among other utilities (Espinosa Mildestein, M., Santana Lugones, J. L. and González Pascual, J. A.; 2019). However, when the problem consists of repeatedly overcoming or resisting the opposition and the efforts of the adversary during combat or competition, it is where strength endurance plays an essential role.

For this reason, only rapid strength and strength endurance are the manifestations to be taken into account during the planning of training with beginners. In accordance with the frequency proposed above and in search of a balanced workout (Table 2), these manifestations of strength will be distributed as follows:

Table 2. - Weekly distribution of the work of muscular strength according to the osteo muscular balance (third basic law for its development)

Lunes		Miércoles		Viernes	
Sector	Manifestación de fuerza	Sector	Manifestación de fuerza	Sector	Manifestación de fuerza
Brazos	Rápida	Tronco	Rápida	Piernas	Rápida
Tronco	De resistencia	Piernas	De resistencia	Brazos	De resistencia

Here it can be seen that each body sector performs exercises associated with different manifestations of strength. In other words, the arms have a fast strength session (Monday) and a strength endurance session (Friday); the trunk has a fast strength session (Wednesday) and a strength endurance session (Monday); finally, the legs have a fast strength session (Friday) and a strength endurance session (Wednesday). In this



way, the balance between the different manifestations of strength, for each body sector, is guaranteed.

The type of exercise is another factor of great importance since children of this age are in the process of osteo-myoarticular development and, therefore, it is not recommended that they perform exercises with significant external loads. In view of this, small and medium weights are alternated with body weight maturity exercises, which are more accessible as they do not require a special apparatus.

Román (2014) is of the opinion that children between 8 and 12 years of age should perform varied and not very specific exercises, based on traction games, displacements, pushes, drags, reptations, climbing and others.

Something that is relevant during the selection of exercises for strength training is that they should be representative of the different chains of muscular action, that is, it is not enough that several exercises have been selected for arm or trunk strength, but it is also required that the arms perform exercises for the flexor muscle chain and the extensor muscle chain. Similarly, the trunk requires exercises for the ventral region, as well as exercises for the lumbar area, which is considered vital because of the stabilizing character of the core musculature (Bompa and Buzzichelli, 2016). This ensures muscle balance (Table 3), thus preventing the antagonist muscles of the different movements, which make up the technical elements, from starting their function early, impairing the work of the agonist muscles of such movements.

Table 3. - Combinations of exercises that ensure the arthromuscular balance

Lunes		Miércoles		Viernes	
Manifestación de fuerza	Cadena muscular	Manifestación de fuerza	Cadena muscular	Manifestación de fuerza	Cadena muscular
Rápida (brazos)	Tracción Empuje	Rápida (tronco)	Ventral Lumbar	Rápida (pierna)	Empuje
De resistencia (tronco)	Ventral Lumbar	De resistencia (pierna)	Empuje	De resistencia (brazos)	Tracción Empuje

This representation of the combination of strength exercises (Table 3) shows how the arms and trunk have programmed work for their different chains of muscular action, in such a way that all manifestations of strength are worked on a weekly basis, attending not only to the body sector, but also to the different chains of muscular action. In the case of the legs, it is more complex to work on the traction chain, given the difficulty for this sector to hold on to an implement to perform the halon movement.

Finally, there is the complex issue of the dosage of the work to be done. At this age, it is not advisable to do a large amount of work because, on the one hand, it is not advisable to subject the body of these children to work whose duration may hinder recovery. On the other hand, during these ages, the fundamental direction of sports training is oriented to the learning and consolidation of technical skills (C. Águila and C. Andújar, 2000).



Therefore, two or three sets per exercise are sufficient to stimulate the development of the different manifestations of strength. Regarding intensity, the bibliography on sports training, to which the authors have had access, establishes that the exercises for the development of fast strength are performed at maximum intensity, with a total recovery time between work intervals. Meanwhile, in the case of strength endurance, the bibliography consulted states that the exercises for this manifestation of strength are performed with moderate intensity and that the recovery times between work intervals should be rigid so as not to allow full recovery between them.

Taking into account all the factors explained in the previous content, examples of variants of the dosage in the weekly planning of muscular strength training (Tables 4, 5 and 6) are presented as follows.

Table 4. - Plan for the first weekly strength training session

Lunes			
Ejercicio	Manifestación de fuerza	Dosificación	Pausa
Tracciones	Rápida	Dos series de diez segundos	Dos minutos
Planchas	Rápida	Dos series de diez repeticiones	Dos minutos
Abdominales de tronco	De resistencia	Dos series de 15 repeticiones	45-60 seg
Hiperextensiones	De resistencia	Dos series de 15 repeticiones	45-60 seg

Table 5. - Plan for the second weekly strength training session

Miércoles			
Ejercicio	Manifestación de fuerza	Dosificación	Pausa
Abdominales de cadera	Rápida	Dos series de diez segundos	Dos minutos
Arqueo	Rápida	Dos series de diez segundos	Dos minutos
Cuclillas	De resistencia	Tres series de 15 repeticiones	45-60 seg



Table 6. - Plan for the third weekly strength training session

Viernes			
Ejercicio	Manifestación de fuerza	Dosificación	Pausa
Salto de rana	Rápida	Tres series de cinco repeticiones	Dos minutos
Soga	De resistencia	Dos series de seis m	45-60 seg
Paralelas	De resistencia	Dos series de 15 repeticiones	45-60 seg

Description of the main strength exercises to be used

- Exercise. Quadruped to the front.
- Fundamental work. Traction of the upper extremities.
- Trunk incidence. Abdominal.
- Exercise. Quadruped backward.
- Fundamental work. Upper limb thrust.
- Trunk incidence. Abdominal.
- Exercise. Quadruped back (crab) backwards.
- Fundamental work. Upper and lower extremities push.
- Trunk incidence. Lumbar.
- Exercise. Back quadruped (crab) forward.
- Fundamental work. Traction of the upper and lower extremities.
- Trunk incidence. Lumbar.
- Exercise. Wheelbarrow in pronation.
- Fundamental work. Traction of the upper extremities.
- Trunk incidence. Abdominal.
- Exercise. Wheelbarrow in supination.
- Fundamental work. Upper extremities push.
- Trunk incidence. Lumbar.
- Exercise. Cockfighting.



- Fundamental work. Upper and lower limb thrust.
- Trunk incidence. Abdominal.
- Exercise. Halon fight (halon between two judo female athletes, controlled by the jacket).
- Fundamental work. Traction of the upper and lower extremities.
- Incidence of the trunk. Lumbar.
- Exercise. Thrust fighting (thrust between two judo female athletes, controlled by the jacket).
- Fundamental work. Pushing of the upper and lower extremities.
- Incidence of the trunk. Abdominal.
- Exercise. Traction of the rope in teams.
- Fundamental work. Traction of the upper and lower extremities.
- Trunk incidence. Lumbar.
- Exercise. Back quadrupedal soccer game.
- Fundamental work. Traction and thrust of the upper and lower extremities.
- Trunk incidence. Lumbar.
- Exercise. Game to the glued in quadruped.
- Fundamental work. Traction and thrust of the upper extremities.
- Trunk incidence. Abdominal.

Methodological indications for the application of the exercises

1. The exercises of higher intensity or greater number of body planes will be the first to be performed in each training session, followed by those of lower intensity.
2. The exercises are performed after the technical work.
3. Exercises will be interrupted immediately in case of muscular or joint pain or discomfort.
4. It is not recommended that strength training coincide with endurance training, due to the high energy expenditure caused by both activities. Its combination with the other motor capacities, i.e. flexibility, coordination capacities or speed, does not constitute an excessive load, due to the low volume with which they are trained.
5. The days of the week for strength training should be Monday, Wednesday and Friday, in order to guarantee the three weekly sessions proposed and that between two consecutive sessions there is a recovery time of 48 hours.



The bibliographic review carried out showed the scarce tendency to elaborate research works aimed at the planning of strength training in athletes of the 9-10 years old category. Nevertheless, some works could be analyzed:

The National Committee of Sports Medicine for Children and Adolescents (2018), belonging to the Argentine Society of Pediatrics, carried out a study entitled: Strength training in children and adolescents: benefits, risks and recommendations. In it, general guidelines for strength training in children are established, among which are a training frequency of two to three times a week, on non-consecutive days and the performance in each session of exercises for the agonist and antagonist musculature of the different body segments. However, no mention is made of the functional directions of strength (rapid strength and strength endurance) that should be included in the weekly planning for the development of this motor capacity in this age group.

A group of authors in their work entitled: Positioning on strength training in young people, also agrees that the ideal frequency for the training of this motor capacity in children is two to three times a week on non-consecutive days. This group of authors does refer to the speed of execution of the exercises, but not from the projection of the functional directions of this capacity (fast strength and strength endurance), but as a need for a slow motor execution for the proper appropriation of the technique of the exercises, subsequently increasing the speed of the movement to obtain greater neuromuscular benefits.

Considering the differentiated attention to the motor capacities that to some extent agree with the studies that the literature gathers on the need to prioritize the work, indistinctly in the time of the same, but still with insufficiencies in their treatment and requiring a more specific attention. To which is added the disregard by these authors of the guiding character of muscular strength. The authors configure a weekly planning program of muscular strength training for judo female athletes of 9-10 years of age which includes the adequate selection of the activities to be performed, which allows the development of this motor capacity, without harming the locomotor apparatus of children who are engaged in organized sports practice. In this sense, the morpho-functional characteristics of this age group were taken into consideration, which condition essential parameters such as: weekly frequency, strength manifestations to be developed, exercises to be performed and their dosage.

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The authors declare not to have any interest conflicts.

Authors' contribution:

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