12 - THE INFLUENCE OF RESISTANCE TRAINING IN PEOPLE WITH DOWN SYNDROME.

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INTRODUCTION

Down Syndrome (DS) is a genetic disorder considered the most common cause of congenital mental deficiency. It is a chromosomal disorder, which has a different number of chromosomes, 47 chromosomes, the case of an autosomal disorder, because, is not linked to sex chromosomes (GALAHUE; OZMUN, 2005; WILLARD, 1993). Due to the significant occurrence, where, according to the census conducted by IBGE in 2000, about 300,000 people who declared themselves disabled patients had SD (IBGE, 2000; Pimentel, 2003), studies should be sought that excels in quality of life of these individuals.

The SD has the potential triggers the advanced age of the mother, (Gallahue, Ozmun, 2005), where, at age 35 will have the same one in three hundred fifty-three chances of having a baby with Down syndrome, while at 40 those odds rise to one in eighty-five (NATIONAL DOWN SYNDROME SOCIETY, 2009). There are estimates that the advanced age of maternal grandmother, also influence (MALIN, RAMACHANDRA, 2006, apud GOMES, 2007), together with factors such as exposure to radiation, inadequate diet, and even "viruses such as measles cause fragmentation of chromosomes, and so are teratogenic, (...) drugs like caffeine, LSD, thalidomide, insecticides, herbicides, and antibiotics (...)" may contribute to the development of the syndrome (WILLARD, 1993. LIMA, 1996 p, 120).

The physical aspects of DS are evident, such as short stature, small hands and feet, the incidence of exacerbated a space between the first two toes, clinodactyly and a single crease in the hands (simian crease). The eyes have epicanthal folds inside the tongue is large and protruding, and the arch of the palate is high and split. Some bone disorders may also occur, such as the reduction of the angles of the acetabulum and the ilium, resulting in a lesser pelvis, and atlantooccipital and atlantoaxial instability, affecting 15% to 20% of cases (ROWLAND, 2002).

You should also consider metabolic disorders of the SD, since, with the extra chromosome, the genetic coding and commands gene activation and inactivation are unbalanced, representing an increase of 50% protein and enzymatic action (Willard, 1993; FIELDS , 2009; ROWLAND, 2002; SYDROME DOWN NATIONAL SOCIETY, 2009; LIMA, 1996). As an example, we have the phosphofructokinase, an enzyme present in glycolysis, which, in individuals with DS, are altered, causing difficulty in absorption of carbohydrates. In addition, modifications such as hypotonic muscle (low muscle tone), the weakened body control and coordination of low efficiency, which can be explained by motor disorders of neurological origin (BORBA JUNIOR; NUNES, 1995), as well as hyperextension and joint instability, resulting in a different pace in the development of the individual with Down syndrome (GALAHUE, OZMUN, 2005).

The impaired motor coordination, low levels of strength and muscle tone are variables that affect the autonomy movement of these people, mainly because the control elements of the body stability are compromised due to various changes (SHUMWAY-COOK, WOOLLACOTT , 1985 apud GOMES, 2007).

METHODOLOGY

The survey consists of a literature review of national and international scientific literature, based on articles and books within the period 1993 to 2011. Consultations were made in the database LILACS, MEDLINE and SCIELO. The survey was conducted from March 2011 to October 2011, using as key words: Down syndrome, resistence training, hypotonic muscle, motor coordination and strength. The articles were selected according to the weight it had on the subject and those who were related to resistence training (RT) and individuals with Down syndrome. The study included articles that had on their content resistence training applied in individuals with Down syndrome and excluded those who had no relation to the practice of resistence training and DS individuals. Thus obtained, about 8 articles that had somehow influence of RT on various aspects of DS.

RESISTENCI TRAINING (RT) AND DOWN SYNDROME

In a publication by Langdon Down, the doctor who first described the physical characteristics of patients with DS (1866 cited in Ward, 1999), titled "Treatment and Education for Persons with Mental Retardation", the author, despite the limitations of scientific time, made some remarks and developed training based on the influence of diet, exercise, sensory stimulation and social activities in the development of individuals with mental retardation.

Because of features like the tendency to overweight and difficulty in motor skills, the less stimulated, syndromic individuals, the greater the limitations presented throughout life, since the developmental patterns of a child DS, compared to a child not with DS are similar, but substantially slower (GALAHUE, OZMUN, 2005). It lies in a fundamental tool for RT also be used as reducing the effects of the DS. Florentino Neto et al (2009, p. 12) also says:

The development of children with Down's syndrome have a similarity to the other, which over the years acquired more strength and improves muscle tone. However, Kisner (5) in 1998, noted that to speed up this process would be necessary to increase physical activity, as the practice of weight training exercises.

Thus, noticeable results could be described on the use of this type, where studies with different variables, such as training frequency, intensity, duration of sessions, operating time, number of exercises and sample group showed changes when compared to the group of conditions sample initially and at the end of the study.

CHARACTERISTICS OF STUDIES AND RESULTS

Of the articles surveyed different duration times of surveys, focus groups and sample frequency of training were observed. The duration of the studies was at least six weeks (LEWIS et al, 2005) and maximum of twenty-four weeks (SILVA JR., 2007). What gives certain character studies of reliability, since the time of researches found are considered significant, using as

reference studies with time could result in lower strength and muscular endurance with the application of RT in non-syndromic (Altimari et al 2008, Azevedo et al, 2007).

As for the weekly training were predominantly two to three sessions per week, but two studies combined aerobic exercise every other day and RT (LEWIS, FRAGALE-PINKHAM, 2005; MENDONÇA ET AL, 2011), which applied a combined intervention aerobic exercise and RT around 6 times a week, but three RT and three sessions of aerobic exercise every other day. The amounts of exercise per training session ranged between six and ten years (SHELDS et al, 2008; LEWIS, FRAGALE-PINKHAM, 2005) lasting 30 minutes and one hour (LEWIS ET AL, 2008; FLORENTINO NETO et al, 2010).

Regarding the six intensities applied in research studies apply moderate intensities (FLORENTINO et al, 2010; Shields; Taylor, 2010; Tsim; Fotiadis, 2004, Shields et al, 2008; Mendonça et al, 2011; SILVA JR., Et al 2007) and only one claimed to have used high-intensity levels (Lewis, Pinkham-Fragale, 2005).

The rep range were always between 8 and 15 repetitions and the number of runs between 2 and 3 series. Since the frequencies of students during the intervention were 75% (FLORENTINO NETO et al, 2010) to 95% frequency (TSIMARAS; FOTIADOU, 2004), which illustrates an acceptance by the research participants according to these figures. Shields et al (2010) makes a very relevant observation in this regard, citing that despite the control group have attended on average 90% of training sessions, the absence was due to illness or vacation and not by pain or impairment resulting from physical training.

The results presented by the research are quite variable, taking into account that the subjects were of different age groups, the survey beyond the duration and intensity also are different, but mostly you may notice changes as the strength and endurance, as shown the following table.

Author	Variable assessed	N	The subjects' age (years)	Time Study (weeks)	Results
Tsimaras; Fotiadou (2004)	Capacity of dynamic equilibrium and muscle strength	15	24,5	12	Statistically significant improvements in peak torque and isokinetic muscle strength of lower limbs. Improvement in the ability of dynamic equilibrium statistically significant.
Lewis; Fragala-Pinkhaml (2005)	Cardiovascular variables, strength, flexibility and body composition	1	10,5	6	Decreased heart rate work, maintenance of VO2, BMI did not change, flexibility within normal limits, improvements in coordination, and increased strength.
Silva Junior et al (2007)	Muscular endurance and body composition	1	16	24	Increased muscular endurance, lean body mass and muscle weight, and increases in body composition.
Shields et al (2008)	Muscle strength, muscle strength and functional capacity	9	19 a 35	10	Statistically significant improvement (moderate to large) in muscular strength, muscular endurance of the upper limbs when comparing the intervention and control groups, the same happened in the lower limbs.
Florentino et al (2010)	body composition	8	15 a 30	12	No significant change in body weight, decrease in% G and increased lean body mass.
Shields; Taylor (2010)	Muscle strength and functional capacity	11	14 a 17	10	There was an increase of the strength of lower limbs, but there was no statistically significant changes in the strength of the upper and not the functional capacity of upper and lower limbs.
Mendonça et al (2011)	Muscle strength and peak VO2 and body composition	13	31 a 42	12	The indices of muscle strength improved similarly in subjects with and without SD. No significant effect on body composition. As improvements in peak VO2
Cowley et al (2011)	Isokinetic peak torque of knee extensors and flexors.	15	20 a 46	10	Increased maximum torque of both the extensor and flexor muscles of the knee. Decreasing the time of ascent and descent of stairs.

Table 1 - Variables of Research and Outcomes.

However, some improvements have not occurred during the intervention period, for example, the study by Silva Jr. (2007), in which the research subjects did not show when reassessed, measures such as reductions in body weight, fat percentage and some anthropometric measurements, indicating that a gap may have existed.

Tsimaras; Fotiadou (2004), reports that despite the improvements alone, when comparing the pre and post test experimental group, statistically insignificant changes considered were found when comparing the control group and experimental group. As in the study of Mendoza et al (2011) there have been no significant effects with this type of training on body composition. However, we obtained significant improvements in how the values of peak VO2, as well as general improvements of strength in both groups.

DISCUSSION

It is important to realize that most studies related to both adults and those related to pre-teens and teens were largely in line with what was determined by the American Academy of Pediatrics (2001) and the American College of Sports Medicine (2009), which gives a character of research reliability and safety in the practice of RT. The results were positive in all gain strength or muscular endurance, which makes this method feasible for the proposed group. Although some gaps were left, the studies were of great relevance to the subject.

CONCLUSION

Some studies had limitations, such as Silva Jr. (2007) when he reported that despite improvements observed no

change in fat percentage of the subject, it may have been given in terms of variables such as the nutritional aspect was not controlled during research. As with other research that showed unchanged variables, it is concluded that this may have given in terms of greater control of variables, and as nutritional, and even in terms of other aspects to the duration of trials. It was felt, therefore, longitudinal studies of character and possibly more controlled variables can point to different results in the combination of this methodology applied to people with Down syndrome. Still, as can be seen in the studies presented, we can say that RT is an intervention that can generate significant changes in individuals with DS, and even reduce the effects of some impairments such as low levels of muscle strength that even present when compared with non-syndromic.

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THE INFLUENCE OF RESISTANCE TRAINING IN PEOPLE WITH DOWN SYNDROME.

ABSTRACT

The Down's Syndrome, a genetic modification brought about by chromosomal abnormalities, is affecting people worldwide with increasingly high rates, either due to the achievement of independence for women, depending on the autonomy of those seeking a more propitious moment, financially to generate a child, which implies and pregnancies at ages older, or because of technological advances that allowed for clarification in terms of a reduction of prejudice, so that people submit their children suffering from Down syndrome to society more easily . Thus, more studies are conducted for a better quality of life for these

individuals, aiming findings of methodologies that allow a greater longevity for the same. It is known that despite the moderate cognitive limitations, they have difficulty coordinating body, motor skills and strength levels, as well as joint hypermobility, high levels of fat percentage and the inefficient coordination. These are just some of the changes that hinder the full development of these individuals engine. One of the methodologies that enable the improvement of strength as well as control and coordination body, and thanks to high energy costs as a result of interval training is weight training, which when applied in these individuals could generate body changes, within a margin of security related to the limitations of these people with the syndrome. Thus this study as a literature review of the database as the Siel, Medline and Lilacs, was aimed at seeking research methodology as that used om Training Weights applied specifically to this group. Thus obtained as a result, considerable changes both in levels of body strength and coordination, such as changes in body composition of people with Down syndrome.

KEYWORDS: Down syndrome, resistance training, muscle strength.

L'INFLUENCE DE LA FORMATION AVEC DES POIDS DANS LES PERSONNES TRISOMIQUES.

SOMMAIRE

Le syndrome de Down, une modification génétique provoquée par des anomalies chromosomiques, affecte les gens dans le monde entier avec des taux plus élevés, soit en raison de la réalisation de l'indépendance des femmes, selon l'autonomie de ceux qui cherchent un moment plus propice, financièrement pour générer un enfant, ce qui implique des grossesses à un âge ou en raison des progrès technologiques qui ont permis de clarifier en termes de réduction des préjugés, de sorte que les gens soumettent leurs enfants souffrant du syndrome de Down à la société plus facilement . Ainsi, plusieurs études sont menées pour une meilleure qualité de vie de ces individus, visant les conclusions de méthodologies qui permettent une plus grande longévité pour le même. On sait que malgré les limitations cognitives modérées, ils ont de la difficulté organe de coordination, de motricité et de niveaux de résistance, ainsi que hypermobilité articulaire, des niveaux élevés de pourcentage de graisse, ont tendance à hiperadiposidade coordination et inefficace. Ce ne sont que quelques-uns des changements qui entravent le plein développement de ces moteurs individus. Une des méthodologies qui permettent l'amélioration de la force ainsi que le contrôle et la coordination du corps, et grâce à des coûts énergétiques élevés en raison de la formation d'intervalle est la formation de poids, qui, lorsqu'il est appliqué dans ces personnes pourraient générer des changements du corps, à l'intérieur d'une marge de de sécurité liées à des limitations de ces personnes avec le syndrome. Ainsi cette étude comme une revue de littérature sur la base de données comme le Siel, Medline et Lilas, visait à la recherche d'une méthodologie de recherche en tant que poids utilisés Formation OM appliquées spécifiquement à ce groupe. Ainsi obtenu, par conséquent, des changements considérables tant dans les niveaux de la force du corps et de coordination, tels que des changements dans la composition corporelle des personnes atteintes du syndrome de Down.

MOTS-CLÉS: syndrome de Down, la formation de résistance, la force musculaire.

LA INFLUENCIA DEL ENTRENAMIENTO CON PESAS EN LAS PERSONAS CON SÍNDROME DE DOWN.

RESUMEN

Síndrome de Down, una modificación genética provocada por anomalías cromosómicas, está afectando a personas de todo el mundo con tasas cada vez más alto, ya sea debido a la consecución de la independencia de las mujeres, en función de la autonomía de aquellos que buscan un momento más propicio, financieramente para generar un hijo, lo que implica y los embarazos a edades mayores, o debido a los avances tecnológicos que permiten una aclaración en términos de una reducción de los prejuicios, de modo que la gente envía a sus hijos con síndrome de Down a la sociedad con mayor facilidad . Por lo tanto, se realizan más estudios para una mejor calidad de vida de estas personas, con el objetivo de los resultados de metodologías que permitan una mayor longevidad de la misma. Se sabe que a pesar de las limitaciones cognitivas moderadas, tienen dificultades para coordinar el cuerpo, las habilidades motoras y los niveles de fuerza, así como la hiperlaxitud articular, los altos niveles de porcentaje de grasa, tienden a hiperadiposidade coordinación e ineficiente. Estos son sólo algunos de los cambios que obstaculizan el pleno desarrollo de estos motores de los individuos. Una de las metodologías que permitan la mejora de la fuerza, así como de control y de coordinación, y gracias a los altos costos energéticos como consecuencia del entrenamiento del intervalo es el entrenamiento con pesas, que cuando se aplica en estas personas podría generar cambios en el cuerpo, con un margen de de seguridad relacionados con las limitaciones de estas personas con el síndrome. Por lo tanto este estudio como una revisión de la literatura de la base de datos como el Siel, Medline y Lilacs, fue el objetivo de buscar la metodología de investigación que se utiliza pesos om Formación aplicado específicamente a este grupo. Así obtenido como resultado, cambios considerables tanto en los niveles de fuerza del cuerpo y la coordinación, tales como cambios en la composición corporal de las personas con síndrome de Down.

PALABRAS CLAVE: Síndrome de Down, el entrenamiento de resistencia, la fuerza muscular.

A INFLUÊNCIA DO TREINAMENTO COM PESOS EM PESSOAS COM SÍNDROME DE DOWN.

RESUMO

A Síndrome de Down, uma modificação genética acarretada por alterações cromossômicas, vem acometendo indivíduos no mundo inteiro com índices cada vez mais altos, seja em virtude da conquista da independência das mulheres, em função da autonomia das mesmas em busca de momentos mais propícios, financeiramente para se gerar um filho, o que implica e gestações em idades mais maduras, ou em virtude do avanço tecnológico que em termos de esclarecimentos possibilitou uma redução do preconceito, fazendo com que as pessoas apresentassem seus filhos portadores de Síndrome de Down a sociedade mais facilmente. Assim, cada vez mais, estudos são realizados em busca de melhor qualidade de vida a esses indivíduos, objetivando descobertas de metodologias que viabilizem uma maior longevidade para os mesmos. É sabido que apesar da limitação cognitiva moderada, essas pessoas possuem dificuldades de coordenação corporal, habilidades motoras, e níveis de força, além da hipermobilidade articular, altos índices de percentual de gordura, tendência a hiperadiposidade e coordenação motora ineficiente. Essas são apenas algumas das alterações que dificultam o pleno desenvolvimento motor desses indivíduos. Uma das metodologias que viabilizam a melhora da força, bem como do controle e da coordenação corporal, e graças aos altos gastos energéticos em virtude do treino intervalado é o Treinamento com Pesos, que aplicado nesses indivíduos poderia gerar modificações corporais, dentro de uma margem de segurança, relacionadas às limitações dessas pessoas com a síndrome. Assim, esse estudo enquanto uma revisão bibliográfica de artigos de base de dados como a Sielo, Medline e Lilacs, teve como objetivo buscar pesquisas que utilizassem como metodologia o Treinamento com Pesos aplicado especificamente para este grupo. Obteve assim como resultado, modificações consideráveis, tanto em níveis de força e coordenação corporal, como modificações na composição corporal das pessoas com Síndrome de Down.

PALAVRAS CHAVEs: síndrome de down, treinamento de resistência, força muscular.