WHEELCHAIR PUSH UP AS A POWERFUL EXERCISES TO INTENSIFY UPPER-BODY STRENGTH AND ENDURANCE AMONG ECTOMORPH STUDENTS

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Summary. Ectomorph often below the average weight characteristics by a “thin frame” and difficult to gain muscle mass and fat. According to similar studies to build their muscle mass under it is necessary to include adequate multiple joints and larger muscle groups in bodybuilding program, in this study by using a wheelchairs, when doing a pushed up. The aim of the study was to improve upper-body strength and endurance among 20 healthy ectomorph male students, selected by the intentional method, according to their weight, which did not correspond to their height. They were controlled while performing push-ups, flexed arm-hangs and chin ups. Our goal was to compare the impacts of two training proposed programs (Traditional with weight (CS) v's wheelchair (ES)). The training programs were applied for 6-weeks with 15-minute warm-ups integrated through their regular PE basketball courses cycle planned in the second semester. Built on statistical apply, we confirmed that wheelchair is a tool that enhances the upper-body muscles of ectomorph-type better than traditional body-weight training. It was approved in the present study through the use of wheelchair push-up, as an excellent means to increase the upper-body muscle-building strength and endurance better than the classic method used by our PE teachers.

Keywords: upper body musculature, wheelchair, ectomorph students.

Introduction

Supported Physical Education and Sport (PE) courses are vital pointers for output public health. Although no studies have testified that using wheelchairs in PE sessions is prompted in the growth of the upper body musculature via the healthy students. Conflicting to rehabilitation studies that uphold the use of a wheelchair to develop strengthening as a valuable method to correct imbalances of the muscles in the upper extremity. Established by (Phil Page 2012) in the context of the consistency of personal trainers that needs to be aware

to develop maximal strength or power (or both), denied by (Jared W Coburn & Moh H Malek 2012) via body-weight training, which will be eliminated because it cannot provide the intensity necessary to develop these physiological adaptations.

From the above and principle that ectomorphs have fragile, delicately built bodies and find it difficult to gain weight or add muscle. Supermodels, ballerinas and basketball players, most commonly fall into this group. Advantages in the present study via physique disability of ectomorphs' body type correlate with height and weight (Frank Galligan, Eric Singleton & David White 2002), as underdeveloped bodies with little muscle and fat (Jane Johnston & Lindy Nahmad-Williams 2014), record via this population.

What is more, those ectomorphs may be underweighting where this disability can limit their physical activity (Tarik Ozmen, Bekir Yuktasir, Birol Yalcin, Mark ET Willems 2014). The case of our sample record is in underweight for its height, acting in line with Laura K. Guerrero, et al. (2006). Appropriate in rehabilitation studies, as global objectives integrate into their program, it must encompass all the effects of mass distribution, linear acceleration and angular acceleration of the work object and body movement (Mauro Ursino 2005) and the development of muscle strength, cardiorespiratory endurance and bone mineral density depending on previous studies. Based on their use, it demands a high level of conditioning to maintain work intensity and to prevent the injury (Goosey-Tolfrey V 2010).

Documented by a similar training program in the efficiency of the wheelchair, it is a tool that can improve the five major motor abilities, which are endurance, flexibility, coordination, strength, and speed (Kestutis Skucas 2012). The evidence that permits us to consider it as a training tool that can develop upper body musculature among ectomorph students cited in the literature as a body type, fragile, with long, slender, poorly muscled extremities and delicate bones. (Gerald T Mangine, Jay R Hoffman, Adam M Gonzalez, Jeremy R Townsend, Adam J Wells, Adam R Jajtner, Kyle S Beyer, Carleigh H Boone, Amelia A Miramonti, Ran Wang, Michael B LaMonica, David H Fukuda, Nicholas A Ratamess, Jeffrey R Stout 2015).

From the above, our involvement in this study is to incorporate the wheelchairs in the EPS courses for 15 minutes of warm-up, during the basketball cycle. It was implicated in this study as a training tool in the interest of the experimental group (ES), for 6-weeks to compare the impacts of two training proposed programs (Traditional with weight (CS) v's wheelchair (ES)). To assess their progress, we used pre-test and post-test, focused on push ups (PH), chin ups test (CH) and flexed arm-hangs test (FAH).

Methods

Researchers used the experimental method by choosing two groups, homogeneous into their disabilities, thought Body Mass Index (BMI) norms recorded in underweight < 18.5 associated with strength or athletic prowess, such as the upper torso or arms to maintain upper body strength, according (Bob Hill 2004). The progress in the present study was achieved via push up (PH), Chin up Test (CH) and Flexed Arm-Hang Test (FAH). Presented in Table 1. Means $\pm$ SD for the two groups (ES) vs (CS) for the two groups (ES) vs (CS).

Table 1

Presents the characteristics through the purpose test used in the present study via pre-test

SAMPLE		N	Mean $\pm$ SD	Shapiro-Wilk		Levene's		T	
				Value	p $\leq$.05	Value	p $\leq$.05	Value	p $\leq$.05
BMI	ES	20	18.26 $\pm$ 1.06	0.92	0.15	0.25	0.62	0.09	0.92
	CS	20	18.22 $\pm$ 1.042	0.97	0.09				
PHT1	ES	20	8.60 $\pm$ 0.99	0.87	0.25	0.96	0.33	0.36	0.72
	CS	20	7.70 $\pm$ 0.73	0.78	0.28				
CU T1	ES	20	5.15 $\pm$ 1.72	0.95	0.17	1.13	0.29	0.21	0.83
	CS	20	5.05 $\pm$ 1.23	0.91	0.18				
FAHT1	ES	20	4.15 $\pm$ 3.65	0.93	0.19	0.31	0.39	0.11	0.92
	CS	20	4.25 $\pm$ 2.86	0.95	0.16				

Participants

Forty students physically active in EPS sessions, from the secondary school of zagllole, Academy Mostaganem participated in this study. Their inability of upper body musculature was determined on the basis of Golding et al. normative data for the push-ups (Pecs) for Men (17-19 years) set by David Nieman (2006, 2007). As well as underweight (BMI < 18.5), admitted by Kenneth F. Ferraro, et al.(2002) as manifested higher disability in most instances (Kenneth F. Ferraro, Ya-ping Su, Randall J. Gretebeck, David R. Black & Stephen F. Badylak 2002).

Interpreting by researchers as the inability of ectomorphs' body type reported in similar researchers as a disability in physique correlates with height relates to weight (Frank Galligan, Eric Singleton & David White 2002), revoked in upper body musculature the case of this study. It was approved by the meaninglessness of independent t-test set in Table 1, in which our sample accepts normality distribution and homogeneity built on Shapiro-Wilk and Levene's.

Assessment that Ectomorphs tend to lack shape because of their low muscle mass and strength perceived by ageing to be associated with increased health care costs (Peggy Mannen Cawthon, Kathleen M. Fox, Shravanthi. R. Gandra, Matthew J. Delmonico, Chiun-Fang Chiou, Mary S. Anthony, Ase Sewall, Bret Goodpaster, Suzanne Satterfield, Steven R. 2009). Confirmed in similar via fragile, poorly muscled extremities and delicate bones (James Burfeind & Dawn Jeglum Bartusch 2015). Their corporal mass (Frank Schmallegger 2009) limits their athletic prowess, especially in the effectiveness of the upper body and arm strength (Brent A Alvar, Katie Sell & Patricia A Deuster 2017).

From this viewpoint, our choice guides us to press up tests to assess the strength endurance of upper body muscles based normative data for the push-ups for men provide by Golding et al. (1986). Supported by (Edward T Howley & Dixie L Thompson 2017) the objective of the Push-Up test is to assess the strength endurance of the athlete's upper body muscles. Flexed Arm-Hang Test and Chin up Test were used to evaluate the arm muscular endurance. It was purposed to determine if the student has adequate upper-body strength according to (Gregory Mast & Hans Halberstadt 2007). For BMI we defined it as weight in kg/ (height in metres) (Zerf Mohammed, Atouti Nouredine & Ben Farouk Abdullah 2017).

Training program

The proposed educating training sessions were carried out on January 18, 2016, until the end of March 13, 2016. Basketball cycle was in the second semester. After the adaptation of our students to use this tool, the researchers applied this training program, which aims to develop upper body musculature base on a wheelchair. The program included three (03) training units in a week of six (06) weeks. 15 minutes of warm-up consisted of:

- All warm-up exercise, both fast and long-duration movements were carried out using the wheelchair. For the ES group in the opposite of the CS group, without chairs.
- All warm-up exercises with balloons were performed using the wheelchair. For the ES group in the opposite of CS groups without chairs.

Warm-up exercises consisted of 6 six exercise stations:

5 min trying to solicit large muscle groups and cardiorespiratory endurance. 10 min Fartlek Training composed of six stations as specific exercises with the ball. See Figure 1.

Figure 1

Describes the proposed group of exercises (Mohammed Zerf, Beboucha Wahib, Bengoua Ali 2017)

Statistical Analysis

To identify differences between training protocols on changes in upper-body Musculature strength. The analysis data was counted using a statistical program SPSS 20.0 for Windows. The characteristics of the sample (mean and standard deviations) were computed for all variables. Data from pre-test (T1) and post-test (T2) were compared with the independent t-test. Statistical significance was set at $p \leq 0.05$.

Results

Our results suggest that using a wheelchair as tool-specific muscle training increases the muscle-building. Muscle strength and muscle endurance via students Ectomorph. Top score in the present study in the profits of the ES group. Approved by a similar training program in the welfare of the wheelchair as a tool that can improve the five major motor abilities, which are endurance, flexibility, coordination, strength, and speed (Kestutis Skucas 2012). Underpinned by (David Joyce & Daniel Lewindon 2014) via high strength-to-weight ratios is an important method to select strength-training exercises. Mention by ACSM it is necessary to use at least 8 to 10 exercises of the various large muscle groups with 8 to 12 repetitions (Gloria M Bulechek & Joanne McCloskey Dochterman 1999). To set up the

resistance method training has been demonstrated to increase total body strength, according to (David J Magee, James E Zachazewski & William S Quillen 2007). It was admitted in this study via the independent t-test Table 2., where the use of the wheelchair as tool-specific muscle training had a greater effect on upper body muscle strength, recorded the benefits of ES, confirmed by (Sue Ann Sisto, Erica Druin & Martha Macht Sliwinski 2009) in the use of the wheelchair strength-endurance training (Goosey-Tolfrey V. 2010).

Table 2.
Differences between groups in changes in the effectiveness of muscle strength after 6 weeks of training

SAMPLE		N	Mean $\pm$ SD	T	
				Value	p $\leq$.05
PHT T2	ES	20	9.55 $\pm$ 2.50	3.27	0.02
	CS	20	7.94 $\pm$ 1.53		
CU T2	ES	20	9.75 $\pm$ 2.17	2.18	0.03
	CS	20	5.55 $\pm$ 2.33		
FAHT2	ES	20	8.6 $\pm$ 1.76	8.22	0.00
	CS	20	5.65 $\pm$ 0.67		

To summarize our results, we agreed with the assumption provided by Vicky Goosey-Tolfrey (2010), that the use of the wheelchair for every day is an excellent way to build strength and improve movement upper body (Vicky Goosey-Tolfrey 2010). The wheelchair pushes increase upper body strength (Fabrisia Ambrosio, Michael L Boninger, Aaron L Souza, Shirley G Fitzgerald, Alicia M Koontz & Rory A Cooper 2005).

Discussion

Figure 2
Describes the differences between the two programs in improving the strength of the upper body

The main results of this study indicated those 6 weeks of the wheelchair as a tool for ES Group V's weight for the CS group to improve upper body musculature among ectomorph

students more efficacy than the method used by our PE teachers. See Fig 2. Confirmed by Joel A. DeLisa, et al. (2005) through power used to pushed wheelchair claimed as key muscle groups requesting the recruitments of upper body muscles strength (Joel A. DeLisa, Bruce M. Gans & Nicholas E. Walsh 2004). Considerate by David X. Cifu (2016), manual materials have high strength-to-weight ratios. Knowledge by Jan Thurman et al. (2004) via a few laps with the wheelchair around the gym will improve individuals strength program's upper body productivity. Approved by L.J. Frankel, R. Harris (2012) push-ups have the benefits as suitable loads for the upper body (L.J. Frankel, R. Harris & Sara Harris 1977). Assumed by Barbara H. Connolly, et al. (2004) push-ups increase the flexors and extensors of the trunk as well as its shoulder (Barbara H. Connolly & Patricia Montgomery 2004). To conclude our experience in this topic, guided users agree that a wheelchair is a benefit-training tool for ectomorph body type to develop their upper body (Teresa Pountney & Teresa E. Pountney 2007). Established by Youlian Hong (2013) as an approach that every coaches or educator must take into its account. Certified by (Goosey-Tolfrey V. 2010) it is a beneficial tool that increases the muscular strength, power and/or range of motion as well as any changes in inter-segment coordination, according to (Youlian Hong 2013). Described by Dr Gareth J. Parry, et al. (2007) it is an excellent exercise, including weight lifting to improve upper limb strength (Dr Gareth J. Parry, MB, ChB, FRACP, Joel S. Steinberg, MD, PhD, FICA 2007). It is the most requested and adequate exercise with individual weight, according to (Robert J. Mutchnick, W. Timothy Austin, Randy Martin 2009), which should be considered early via those somatotypes, according to (Michael A. Alexander, MD, Dennis J. Matthews, MD & Kevin P. Murphy 2015). Concluded in this study, it is a beneficial training tool requested to reduce the impact of weight disability that limits Ectomorph physical levels activity, according to (Tarik Ozmen, Bekir Yuktasir, Birol Yalcin & Mark ET Willems 2014), upper-body strength and endurance in the case of this study have the five major motor abilities, like endurance, flexibility, coordination, strength, and speed, according to (Kestutis Skucas 2012)

Conclusions

The results indicate that the PE teacher must take into his consideration the changes in body shapes in the early stage of growth. Confirmed in the present study via ectomorph body type, to use the wheelchair, as a training tool, can improve the five major motor abilities, like endurance, flexibility, coordination, strength, and speed. Claimed in the present study, through the benefits of wheelchair push-ups, we can improve upper body strength at a high

level of conditioning to maintain work intensity and to prevent injury especially among ectomorph body type. The use of wheelchair push-up exercises is very beneficial in gaining quality muscle able to promote arm strength, upper-body strength and endurance.

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