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Analysis Study for some Biomechanical Variables for Handicaps weightlifters in Bench-Press

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INTRODUCTION:

The biomechanics is a subject among other sciences from the natural sciences, which studies the physical analysis of biological systems, consequently, physical analysis of body movement. these movements are studied through laws and mechanic patterns in function of specific characteristics of the human biological system

(Amadio et al, 1996, 97) (Taborda, et al, 2007, 641)

Biomechanics in a multidisciplinary field, know from a variety of fields, in clouding human anatomy and physiology, mechanics, engineering and mathematics utilized in biomechanics.(Mc Ginnis,1999,1)

The knowledge of sport mechanics help to produce better performances and help to become a better coach also helps to become more critical and appreciative of the a basic understanding of mechanical precepts helps produce an improved performance.(Carr, 1997, 3-4).

The biomechanics inclusion kinematics and kinetics, kinematics is the study of bodies in motion without regard to the causes of the motion. it is concerned with describing and quantifying both the linear and angular positions of bodies and their time derivatives. kinetics is the study of the forces and torques that cause motion of bodies, specifically for human movement. (Robertson, et al, 2004, 9, 145)(Hall, 2000, 644)

The analysis is the primary method of improving human movement of clients in many kinesiology professions. Good qualitative analysis requires an inter disciplinary approach that integrities all sub disciplines of kinesiology. The biomechanics researcher neglect the handicaps events but we feeling its very important in our scientific work because the handicaps has special sports event as the healfl humans. (knudson and Morrison, 2002, 1)

The handicap weightlifter compete in bench-press lift, every weightlifter gives three attempt. the weightlifter be distributed in ten categories. The bench-press lie in a supine position on a flat bench with your legs on the bench and lit it by belt also the waist, using a hand grip that about six inches wider that your shout lders width.(not more 97 cm between the gribs). bring the barbell to arms length above the chest but in line with shoulders. after the judge signal the weightlifter lower the barbell to a position on the chest that is about an inch below the nipples of the pectorals. still about one to two second and do not relax and drop the weight on the chest but lower it with complete control making a definite pause at the chest before pressing it back to starting position. keep the head on the bench and do not arch the back too sharply as to raise your hips off the bench. when you complete extension your arms wait the judge signal to rest the barbell on the holder then leave the bench during (30) second because if the `weightlifter is not leave the bench during (30) second the lift be un success. (Bearls, 1979, 133) (Newton,2002, 132-133).

The study has as aims to analyze biomechanically of bench-press lifter for handicap weightlifters.

METHODS:

The researchers used some computer programs to analysis the movement of the barbell trajectory (I film, Adobe premier, ACD See, Auto cad 2002, Excel).

The sample of this study was constituted by four handicap weightlifters whose win gold, silver and bronze medals in Paralympics games and world championships, with average of (31.75 ± 1.7) years old and (86.0 ± 9.96) Kg body mass. see table (1)

To make a measurement related to the weightlifters arms length, arms ranges and chest width,mass it was used a tape and scale with resolution of (0.1) kg in the biomechanics analysis, it was used camera MD 9000 digital, speed (25) f. pm, put vertical on side of bench, it height and for also one meter of dimension ruler. it was also used bench and official barbell.

The researcher analyze a good lift about 90% from best result. The variables chosen from (AL-tikrity. 1985)(AL-tikrity. 1993)

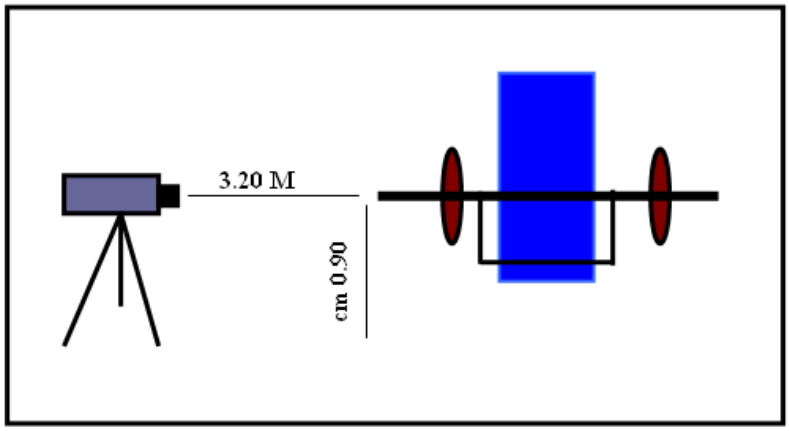

Figure (1): Camera position related to the weightlifters

Table (1) Average Values and standard divation of the sample

variable / lifters	Mass kg	Old years	Weight analysis kg	Chest width cm	Rang of arms Cm	Arm length cm
Thaeir. A	81	32	185	55	165	69
Fares. S	99	34	210	56	182	76
Fares. A	88	31	185	52	172	72.5
Radwan.T	76	30	175	45	174	74
$\bar{X}$	86	31.75	188.75	52	173.25	72.87
Sd ±	9.96	1.70	14.93	4.96	6.99	2.95
coefficient difference %	11.58	5.35	7.9	9.53	4.03	4.04

The analyzed variables in bench-press lifts execution phases were velocity of the bar at lowering and pushing phases, time of lowering and pushing phase, division of the bar from the gravity line at lowering and pushing phase distance of lowering and pushing phase, work, power, kienematically energy at lowering and pushing phase and the anthropometric variables.

To the data analysis was realized descriptive statistics average, standard deviation, correlation of Pearson.

RESULTS:

The variables of trajectory of the bar in bench-press lifts shun on the table(2).

Table (2) Average values and standard deviation of the trajectory variables of the barbell.

	Statistics variables / Biomechanics variables	Average	Standard deviation
1	Lowering distant cm (H1)	**83.14**	**4.86**
2	Pushing distant (H2)	**81.39**	**4.48**
3	High of (D1) cm (H3)	**52.62**	**9.41**
4	High of (D2) cm (H4)	**43.92**	**11.29**
5	Deviation of the bar in lowering phase cm (D1)	**24.4**	**8.02**
6	Deviation of the bar in pushing phase cm (D2)	**7.6**	**2.31**
7	Deviation of the bar in the final point cm (D3)	**15.60**	**4.89**
8	Time of lowering phase sec (T1)	**1.41**	**0.19**
9	Time of pushing phase sec (T2)	**1.74**	**0.16**
10	Velocity of lowering phase cm / sec (V1)	**59.92**	**9.69**
11	Velocity of pushing phase cm / sec (V2)	**47.22**	**6.61**

*** Significant correlation in ≤ 0.05 n = 4**
**** Significant correlation in ≤ 0.01 n = 4**

DISCUSSION:

The results on table (2) show that the distant of lowering the barbell phase (H1) (83.14 ± 4.86) cm was bigger than the distant of pushing the barbell phase (H2) (81.39±4.48) cm, also the high of big deviation of the barbell from the gravity line in lowering phase (H3)(52.62±9.41) cm was highly than the high of big deviation of the barbell from the gravity line in pushing phase (H4)(43.92± 11.29) cm.

The deviation of the barbell in the lowering phase (D1) (24.4 ± 8.02) cm was smaller than the deviation of the barbell in the pushing phase (D2) (7.06 ± 2.31) cm. also the time of lowering phase (T1) (1.41 ± 0.19) sec. smaller than the time of pushing phase (T2) (1.74 ± 0.16) sec.

The velocity of lowering phase (V1)(59.92 ± 9.69) was faster than the velocity of pushing phase (V2) (47.22 ± 6.61) cm/sec.

CONCLUSION:

The researchers attain to model of the trajectory of the barbell to the bench-press lift for the handicaps weightlifter as show in fig (2).also to the valuables of biomechanics variables and the correlation between the anthropometric measurements.

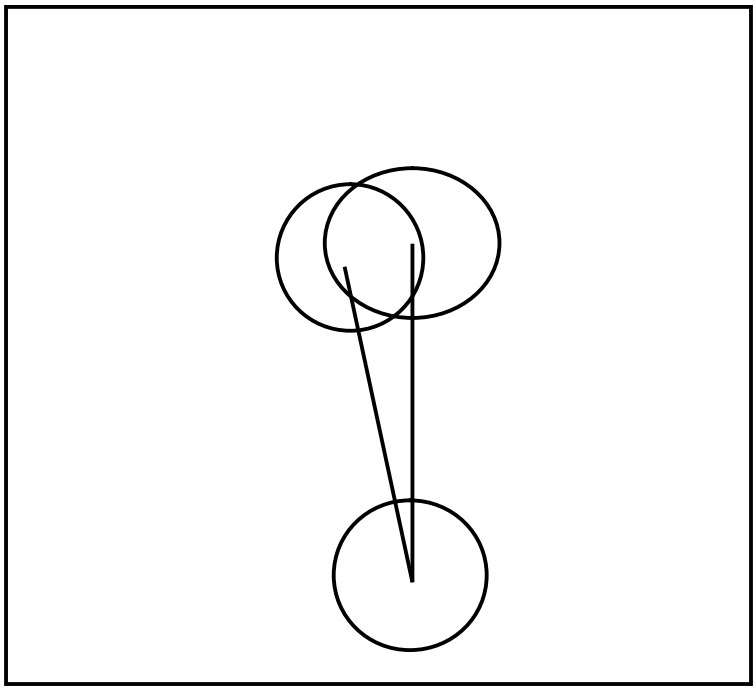

fig (2).

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