Volume : 3 | Issue : 2 | February 2014 • ISSN No 2277 - 8179

Research Paper

A study of correlation of age and gender with muscular fitness in MBBS students

Medical Science

KEYWORDS : Kraus-Weber test, Flexibility test, Muscular fitness

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ABSTRACT

Kraus-Weber test is a test to screen the function of musculoskeletal system. The aim of present study is to study the correlation of muscular fitness with age and gender in the study group. The present prospective study was conducted over a period of two year on 200 medical students. All components of Kraus-Weber test were performed and Failure in even one test item was taken as failure in the Kraus-Weber test. For statistical analysis SPSS version 16 was used to calculate p value. If the p value was <0.05, it was considered significant. High failure rate was observed in females 55% as compared to males 38.3%. Maximum failure percentage was found at the age of 19 years. So, more attention and efforts are needed to keep our adolescent females more muscularly fit.

Introduction:
Physical fitness is recognized as an important component of health and it may be important for the performance of functional activities and quality of life.1. Musculoskeletal system of our body helps us to perform our routine activities, and any type of affliction of this system signals, dire consequences for our body.2

Kraus-Weber test is a simple test which can help us to effectively screen the function of musculoskeletal system before the suspected cases are subjected to more exhaustive procedures such as Electromyogram. Kraus-Weber test is a battery of six different tests which help to measure a number of different muscle groups with regard to their strength and flexibility. Each of these tests is a pass or fail test with a "fail" in any of the six test items constituting a whole test failure.3,4

The aim of present study is to study the correlation of muscular fitness with age and gender in the study group.

Materials and Methods:
Study design and subjects:
The present prospective study was conducted over a period of two year on 200 medical students of Government Medical College, Bhavnagar after taking clearance from ethical committee of the institute. These students were selected because they all were from same age groups and they all were under same current educational environment at present so as to get an unbiased representative sample. The students with significant positive medical or surgical history in the recent past and with known musculoskeletal disorder were excluded from the study. Age, gender and the results of each test was recorded in a performa given to every student in their own words.

Kraus-Weber test3,4
After explaining the nature of the study to students, informed consent was taken from each student. Kraus-Weber test was carried out in a well lighted and well ventilated room (Table 1). Female students were tested in the presence of a female attendant. The students were shown how to do each test item accurately and then they were asked to perform the same. There was no "warming up" before the students undergone the tests. If a subject could perform all the above test items successfully was being declared as successful or passed the Kraus-Weber test. Failure in even one test item was taken as failure in the Kraus-Weber test.

Statistical analysis:
Successes and failures in "The Kraus-Weber Tests" were compared with respect to the other parameters mentioned above using standard statistical methods. Qualitative parameters (Gender and Age) were compared using SPSS version 16. If the p value was <0.05, it was considered significant.

Results:
A total of 200 students (120-boys, 80-girls) were enrolled in the study. Among 120 boys, 59, 51 and 10 were of 17, 18 and 19 years age groups respectively. Out of 80 girls, 40, 34 and six were of 17, 18 and 19 years age groups respectively. Kraus-Weber test was performed on each student. Results of Kraus-Weber test in terms of success and failure are shown in table 2 & table 3. The 90 students were not able to perform one or the other test items of Kraus-Weber test. Hence, the overall failure rate was 45%. Maximum failure percentage of 62.5% (10/16) was found at the age of 19 years followed by 18 years 47% (40/85) and 17 years 40.4% (40/99) (Table 2). High failure rate was observed in females 55% (44/80) as compared to males 38.3% (46//120) (Table 3). In terms of p value (0.020), this was significant.

Discussion:
In the current study, overall 45% failure rate was observed in any one of the six test items in Kraus-Weber test. Maximum failure percentage was seen in test item 6 or flexibility tests (30%) and test item 2 (12.5%). Other authors also found that flexibility test (test 6) caused the greatest percentage of failure in their study groups.5-7 Flexibility failures increased as age increased.5,6 Flexibility failure reported in the first study by Gharote and Ganguly was 20.3%. Next study by Gharote reported flexibility failures to the extent of 45.9%.2

The overall failure rate in boys was 38.52% while in girls it was 55.0%. Our results are in accordance with a previous study from India by Kulkarni et al who also reported high failure rate in females than males in KW test.8 However, studies from other parts of world, mostly from developed countries, have stated that girls were more muscularly fit and flexible than boys.5,6

Maximum failure percentage of 62.5% was found at the age of 19 years in this study. At this age 83.32% girls were failed in the tests, while failure percentage of boys was 50%. Minimum failure percentage of 36.68% was found at 17 years of age. At this age 33.88% of boys and 50% of girls failed in the tests.Statistical analysis of data with respect to age

Volume : 3 | Issue : 2 | February 2014 • ISSN No 2277 - 8179

of Kraus–Weber test success and failure shows a non significant p value. So, according to my study and results, one can say, at the age between 17-19 years, in first years medical students, age is not the factor that shows significant changes in the results.

Conclusion:
Regular periodic administration of Kraus-Weber tests to students can help to diagnose and counter musculoskeletal disorders before they manifest themselves fully causing debilitating morbidity and irreversible damage. More attention and efforts are needed to keep our adolescent females more muscularly fit.

Table 1: Procedures to perform different test components of Kraus-Weber test

First Test (A+P) Abdominals plus psoas: subject maintaining a lying down position (supine) with hand held behind the neck. The feet were held by examiner and the subjects were instructed to roll up into a sitting position.
Second Test (A-P) Abdominals Minus Psoas. This test requires the same posture as in the first test but knees must be bent and the ankles positioned as close to buttocks. After which ask the subject to do a single sit-up.
Third Test (P) Psoas (Lower Abdominals): Ask the subject to lie flat on his back (prone) and hands behind neck and legs must be straight and lifted about ten inches above the ground for ten seconds.
Fourth Test (UB) Upper Back: The subject was made to lie prone with hands behind neck and a pillow placed beneath lower abdomen. With feet held down, ask the subject to lift up his head and shoulders as well as the chest off the ground for about ten seconds.
Fifth Test (LB) Lower Back: The subject was made to lie prone over a pillow with head resting on his hands. Subject was instructed to lift his knees straight off the floor for ten seconds while the examiner holds down his chest.
Sixth Test (B+H) Back and Hamstrings: Subject need to stand erect and barefoot with his hands at sides and both feet must be placed together, then, with knee straight, subject need to bend slowly to touch the ground with his fingertips and he must hold this position for 10 seconds.

Table 2: Number of success and failure of Kraus-Weber tests in each sex at different Ages

		Success n (%)	Failure n (%)	Number of subjects failed in K-W Test Items			
				Any 1 out of 6 tests n(%)	Any 2 out of 6 test n(%)	Any 3 out of 6 tests n(%)	Any 4 out of 6 tests n(%)
17 years	Boy 59	39(66.1)	20(33.8)	17(28.8)	2(3.3)	1(1.6)	00
	Girl 40	20(50)	20(50)	9(22.5)	11(27.5)	00	00
	Total 99	59(59.5)	40(40.4)	26(26.2)	13(13.1)	1(1)	00
18 years	Boy 51	30(58.8)	21(41.1)	19(37.2)	2(3.9)	00	00
	Girl 34	15(44.1)	19(55.8)	13(38.2)	5(14.7)	00	1(2.9)
	Total 85	45(52.9)	40(47)	32(37.6)	7(8.2)	00	1(1.1)
19 years	Boy 10	5(50)	5(50)	3(30)	1(10)	00	1(10)
	Girl 6	1(16.6)	5(83.3)	3(50)	1(16.6)	1(16.6)	00
	Total 16	6(37.5)	10(62.5)	6(37.5)	2(12.5)	1(6.2)	1(6.2)
Total	Boy 120	74(61.6)	46(38.3)	39(32.5)	5(4.1)	1(0.8)	1(0.8)
	Girl 80	36(45)	44(55)	25(31.2)	17(21.2)	1(1.2)	1(1.2)
	Total200	110(55)	90(45)	64(32)	22(11)	2(1)	2(1)

***Figures in parenthesis indicate percentages.**

Table 3: Number of success and failure in Individual item of Kraus-Weber tests in each sex at different Ages

		A+P		A-P		P		UB		LB		B+H	
		S	F	S	F	S	F	S	F	S	F	S	F
17 years	Boy 59	58	1 (1.6)	57	2 (3.3)	58	1 (1.6))	59	0 (0)	57	2 (3.3)	41	18 (30.5)
	Girl 40	33	7 (17.5))	32	8 (20)	39	1 (2.5)	39	1 (2.5)	37	3 (7.5)	29	11 (27.5)
18 years	Boy 51	50	1 (1.9)	48	3 (5.8)	49	2 (3.9)	50	1 (1.9)	48	3 (5.8)	38	13 (25.4)
	Girl 34	31	3 (8.8)	28	6 (17.6)	33	1 (2.9)	34	0 (0)	31	3 (8.8)	20	14 (41.1)
19 years	Boy 10	7	3 (30)	7	3 (30)	10	0 (0)	9	1 (10)	10	0 (0)	8	2 (20)
	Girl 6	3	3 (50)	3	3 (50)	6	0 (0)	6	0 (0)	6	0 (0)	4	2 (33.3)
Total	Boy 120	115	5 (4.1)	112	8 (6.6)	117	3 (2.5)	118	2 (1.6)	115	5 (4.1)	87	33 (27.5)
	Girl 80	67	13 (16.2)	63	17 (21.2)	78	2 (2.5)	79	1 (1.2)	74	6 (7.5)	53	27 (33.7)
	Total200	182	18 (9)	175	25 (12.5)	195	5 (2.5)	197	3 (1.5)	189	11 (5.5)	140	60 (30)

***Figures in parenthesis indicate percentages.**

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