



Science, Movement and Health, Vol. XIX, ISSUE 2 Supplement, 2019
September 2019, 19 (2 supplement): 228 - 237
Original article

STUDENTS 'SOMATOFUNCTIONAL PARAMETERS IN THE PHYSICAL THERAPY LICENSE CYCLE OF THE SECOND YEAR - COMPARATIVE STUDY FOR 2 YEARS

GEAMBAȘU ADINA¹, IONESCU OANA CRISTIANA¹

Abstract

The fundamental particularities of the growth and development of the human body of major importance is the evaluation and observation of the parameters with great influence on their physical activity, work, sport and exercise capacity, but especially the prognosis of the continuity of a long life in the optimal parameters of health .

“The human beauty ideal consists in maintaining a correct body posture, capable to provide the state of the psychical comfort necessary to perform daily activities, both personal and professional, in optimal conditions”¹

In the field of physical therapy study, starting from early ages until old ages, we address assessment, prognosis and treatment of the functional and somatic parameters of the human body or of its pathologies.

The physical therapist in the chosen profession must be not only a model to be followed as an image but especially in the proper functioning of the functional parameters, according to the principle: "Be what you teach."

Evaluation of the somatic and functional parameters of the physical therapy students in their terminal year, by assessing their morphological and functional particularities, is necessary in order to define the state of health and the biological potential of a community.

To support this evaluation, during the seminars of Physical Therapy classes with the subject “Physical therapy of the physical functional and sensory deficiencies”, from the second year students of Physical Therapy Faculty of UNEFS Bucharest, have begun the study of somatic functional parameters by measuring and evaluating our own students. As a result we collected a series of data for each year, data used in observation and education of the students.

Most of the evaluated students practice different types of sports. As a mention, “the game, due to its accessibility, can effectively contribute to solving specific problems of medical physical therapy by using tactical methods, team games on a normal sized field (football) or reduced sized fields (handball). They recommend to adapt the game (content, durations, intensity, play conditions) according to the age, deficiency degree, after a prior somatic functional and psychic evaluation, as per sportive physician recommendation.”(Blendea, Iordache, 2016).

“Exemplifications from different sportive branches promote efficient and attractive training of children, promote instructional technologies to ensure the quality and efficiency of the training in order to help the social integration” (Blendea, Iordache, 2016).

Key words: somatofunctional indexes, physical therapy, student, health, potential.

Methods and technics

Consequently, during the seminars of this discipline in the years 2017-2018 and 2018-2019, we performed a series of somatic-functional testing on the participating students. In this paper we presents the most significant of them: height, weight, span thoracic elasticity, diameters and thoracic perimeters, plumb evaluation, elasticity of the shanks and thighs muscles, lateral mobility, measurements from which we obtained mathematical data, interpreted using statistical methods.

The muscle-joint-ligament qualities of the human body can be also analyzed from other perspectives and aspects like the one of the relaxation

of the muscles.

“Miorelaxation effect is based mainly on vasodilatation and is responsible for a large supplement of nutrients in the tissue.” (Blendea, Iordache, 2016).

As a main working method we used the evaluation and measurement method and the comparison method. We used specific equipment such as metric band, anatomic compass, taliometer, CAS, weighting scale, ruler, stool.

Description of the measurements:

The height:

¹UNEFS/ Physical Therapy, Bucuresti, Romania
Email: adina.p.geambasu@gmail.com, oana_cristiana2000@yahoo.com
Received 5.03.2019 / Accepted 4.05. 2019

² the abstract was published in the 19th I.S.C. "Perspectives in Physical Education and Sport" - Ovidius University of Constanta, May 16-18, 2019, Romania



The subject stands on his sole, his back to the wall, the spine aligned on the metric ban, the heels one next to each other, knees extended, hands stretched out near the body, straight back, eyes front; the 90 degrees square is placed over the top of the head on the vertex. The heights is measured in centimeters from the vertex to the sole.

The weight:

The subject is bear-footed, light dressed and climb on weighting scale with both feet symmetrically placed. The weight is measured in kilograms.

Arm Span:

The subject stands with the back at the wall, eyes front, closed heels, arms laterally stretched out 90 degrees. The span is measured with the metric band on the wall, between the tip of the middle fingers of the subject.

Thoracic perimeter (total thoracic elasticity) in inspiration and expiration:

The subject is standing with arms slightly abducted, pass the metric band laterally under the axles, rearward at the lower angles of the scapula, and previously at breast level in boys and overmamar at the girls on the 4-th rib level; with one hand the evaluator fixes the 0 end of the metric band to the stern, with the other hand sliding the metric band's mobile end depending on the student's chest's breathing and mobility.

Ask the subject to make a maximum inspiration and identify the value, then a maximum expiration, and write down the value. The difference between these two values is the total thoracic elasticity of the subject under assessment. Repeat 3 times and score the best value.

Abdominal perimeter:

The subject in the stand is measured with the metric band at the navel of the umbilicus - the relaxed abdomen, the abdominal perimeter, expressed in cm.

Anterior- posterior thoracic diameter (Anterior posterior thoracic elasticity):

Subject is standing. The evaluator applies the anatomical compass horizontally with one end at the xifoid appendix with the other end at the thoracic spine. Maximum inspiration is required, then maximum expiration and the values obtained on the compass spring. The difference between them is the

anterior-posterior elasticity of the subject's chest. Repeat 3 times and score the best value.

Anterior mobility:

The subject in the stand on a bench attached to the wall, the elbows close, the extended knees, the more straight back, the anterior torsion of the trunk on the lower limbs with the arms stretched the palms with the fingers to the ground before the legs. If the subject touches the backyard in front of the feet with the tips of the middle fingers, note the value 0. If the subject does not reach the bib with the fingers, it is measured with the metric band from the middle fingers to the minus bin. If the subject is overlaid with the fingers, it is measured with the metric band plus from the middle fingers to the bank.

Lateral tilt:

The subject in the stand with close heels, extended knees, looking ahead, wall-tied occipital, hands on the median line of thighs with extended fingers. Ask the subject to execute left-right side bending, keeping hands on the thigh, feet on the ground, looking ahead and head on the wall. It measures with the metric band from the middle to the ground, the left right and the differences between them.

Techniques and methods of working with the equipment used were also the same with their realization, taught by students in practical lessons, thus making interactive seminars with direct learning learning.

The data collected during the two academic years can be found in the no. 1 and 2.

Table no. 1: Measurements of the students in 2017-2018

No.	Gender	Age	Height (cm)	Weight (kg)	Span (cm)	Thoracic perimeter (cm)			Waist (cm)	Anterior-posterior diameter (cm)			Transversal diameter (cm)			Anterior Mobility (cm)	Lateral Tilt (cm)		
						Inspir.	Expir.	Difference		Inspir	Expir	Difference	Inspir	Expir	Difference		Right	Left	Difference
1	M	21	185	86	188	90	87	3	85	28	26	2	34	32	2	1	44	42	2
2	M	20	181	63	188	99	95	4	85	24	20	4	33	30	3	-3	43	42	1
3	M	21	181	80	180	89	78	11	88	22	18	4	32	28	4	15	52	49	3
4	M	22	194	80	192	98	90	8	87	27	22	5	35	32	3	-4	43	42	1
5	M	28	190	85	187	96	89	7	88	24	20	4	33	31	2	7	50	50	0
6	M	27	183	85	187	100	94	7	85	23	20	3	33	30	3	5	40	45	-5
7	M	22	170	63	169	96	92	4	84	27	22	5	35	32	3	-1	43	42	1
8	M	20	183	81	189	98	93	5	78	21	16	5	36	31	5	6	49	52	-3
9	M	21	176	69	172	90	86	4	81	22	18	4	30	25	5	0	40	41	-1
10	M	20	181	73	189	98	93	5	78	21	16	5	36	31	5	2	49	52	-3
11	M	20	185	70	187	94	87	7	77	26	22	4	37	34	3	-15	54	54	0
12	M	19	185	100	181	103	98	5	108	37	34	3	47	44	3	-11	53	53	0
13	M	20	193	84	197	87	83	4	84	25	20	5	24	21	3	5	55	52	3
14	M	21	186	82	180	101	95	6	82	28	24	4	35	32	3	-20	45	45	0
15	M	23	180	69	184	90	82	8	74	22	19	3	30	26	4	0	43	45	-2
16	M	22	170	65	173	89	81	8	73	21	18	3	29	25	4	0	43	43	0
17	M	24	178	75	180	90	83	7	75	24	21	3	31	27	4	-10	45	45	0
18	M	24	182	80	176	94	90	4	90	23	20	3	33	30	3	0	39	40	-1
19	M	21	180	94	181	102	95	7	102	26	23	3	36	32	4	0	50	51	-1
20	M	22	184	70	192	100	91	9	85	27	22	5	34	31	3	2	45	45	0
21	M	20	183	70	179	93	85	8	76	23	19	4	33	30	3	3	55	56	-1
22	M	20	182	79	192	100	92	8	91	27	22	5	35	32	3	-3	43	42	1
23	M	20	178	66	177	93	82	11	82	20	15	5	33	30	3	10	49	50	-1
24	M	21	192	83	203	94	85	9	89	21	19	2	36	33	3	13	49	50	-1
25	M	21	176	62	176	81	75	6	76	25	19	6	30	26	4	0	40	41	-1
26	M	20	194	78	203	115	108	7	80	25	19	6	31	28	3	20	40	40	0
27	M	21	178	67	173	88	81	8	86	28	22	6	36	33	3	-5	47	47	0
28	M	20	181	100	175	101	95	6	95	29	25	4	36	33	3	-4	44	45	-1
29	M	20	170	72	160	100	94	6	78	27	23	4	34	31	3	-2	40	40	0
30	M	22	183	81	194	93	86	7	85	28	25	3	34	30	4	-4	43	42	1
31	M	22	173	75	170	95	90	5	84	34	31	3	40	36	5	0	39	40	-1
32	M	20	175	67	180	88	83	5	80	21	19	2	29	25	4	22	20	22	-2
33	M	20	181	83	179	96	86	10	89	23	19	4	32	28	4	-21	36	39	-3
34	M	21	184	83	181	102	98	4	89	22	20	2	34	32	2	0	51	52	-1
35	M	20	180	82	187	96	87	9	88	30	23	7	39	34	5	-9	49	49	0
36	M	22	182	74	177	94	90	4	79	24	21	3	34	29	5	3	49	47	2
37	F	35	165	55	164	91	85	6	74	19	16	3	32	28	4	2	51	56	-5
38	M	20	195	83	210	102	97	5	82	32	28	4	26	22	4	5	52	52	0
39	M	22	199	108	198	111	103	8	106	38	34	4	27	23	4	0	43	43	0
40	M	20	184	93	184	95	84	11	82	28	20	8	41	30	11	0	30	30	0
41	M	22	172	75	166	101	95	6	89	25	23	2	35	31	4	6	36	40	-4
42	M	21	170	66	170	89	79	10	80	21	17	4	32	28	4	15	36	40	-4
43	M	20	185	85	185	90	81	9	74	24	21	3	34	28	6	-6	42	43	-1
44	M	20	181	71	176	93	84	9	81	25	20	5	31	29	2	0	30	28	2
45	M	20	181	75	181	89	78	11	79	22	18	4	32	28	4	15	36	40	-4
46	M	27	185	83	185	91	85	6	81	24	20	4	36	31	5	18	42	41	1
47	M	21	180	78	180	100	89	11	80	25	20	5	31	29	2	-2	50	50	0



48	M	20	175	75	170	96	88	8	83	25	21	4	32	29	3	-17	52	50	3
49	M	20	185	73	185	97	86	11	80	24	19	5	33	27	6	-5	45	45	0
50	M	20	182	98	181	115	111	4	100	28	25	3	37	33	4	-10	48	47	1
51	M	22	178	61	178	85	78	7	70	22	18	4	31	26	5	2	43	45	-2
52	M	21	196	100	198	103	97	6	93	25	20	5	38	33	5	14	57	59	-2
53	M	20	178	70	175	85	81	4	77	20	14	6	30	24	6	-1	49	48	1
54	M	20	173	77	168	96	90	6	89	23	20	3	32	29	3	-15	48	49	-1
55	M	21	205	108	210	109	100	9	97	27	21	6	40	35	5	17	50	57	-7
56	M	22	180	71	170	96	90	6	81	26	22	4	31	26	5	1	56	57	-1
57	M	21	178	67	174	87	83	5	80	27	20	7	37	34	3	0	54	54	1
58	M	21	187	100	192	106	98	8	96	23	17	6	34	28	6	-10	46	47	-1
59	M	21	170	60	174	87	83	4	77	20	17	3	30	22	8	4	43	48	-5
60	M	20	190	83	186	97	93	4	84	25	19	6	24	21	3	16	54	52	2
61	M	20	185	74	178	94	90	4	80	25	20	5	38	35	3	7	56	56	0
62	M	20	180	90	187	97	92	5	91	23	17	6	34	28	6	15	46	47	-1
63	M	21	180	63	174	85	79	6	79	25	22	3	36	34	3	-14	52	55	-3
64	M	24	185	85	179	105	99	6	90	32	23	9	42	38	4	-3	54	54	0
65	M	21	178	79	176	100	95	6	88	24	21	3	40	37	4	7	48	49	-1
66	M	20	174	69	170	93	88	5	76	26	23	3	36	33	3	-14	43	48	-5
67	F	20	185	80	184	97	92	5	82	27	20	7	35	29	6	20	45	45	0
68	F	21	170	61	166	92	83	9	71	21	17	4	20	26	-6	-35	57	59	-2
69	M	19	193	87	187	106	100	6	82	28	23	5	39	36	3	-25	60	57	3
70	F	20	173	59	171	88	82	6	70	16	14	2	28	25	3	-20	53	49	4
71	M	20	180	72	173	100	91	9	82	25	21	4	33	29	4	4	48	50	-2
72	F	20	169	56	165	85	79	6	67	15	16	-1	28	26	2	-18	53	49	4
73	F	20	173	60	172	78	71	7	77	20	17	3	30	27	3	0	46	46	0
74	F	20	161	55	162	89	84	5	71	19	17	2	30	26	4	10	37	42	-5
75	F	20	165	53	164	88	81	7	67	20	17	3	26	22	4	0	41	43	-2
76	M	22	180	84	179	101	95	6	89	31	26	5	41	36	5	0	50	50	0
77	F	20	172	75	168	103	96	7	84	26	18	8	34	28	6	-15	48	47	1
78	F	20	170	54	170	90	84	6	65	23	18	5	30	26	4	7	52	53	-1
79	M	41	183	90	185	105	100	5	100	35	32	3	36	33	3	8	48	48	0
80	F	28	171	51	165	86	79	7	68	18	16	2	27	25	2	0	49	50	-1
81	M	22	170	66	162	88	84	4	80	21	19	2	30	25	5	1	44	43	1
82	M	20	187	72	185	98	91	7	78	27	23	4	38	35	3	-15	56	56	0
83	F	33	170	60	170	87	82	5	74	20	18	2	29	27	2	0	51	50	1
84	F	20	171	60	170	91	86	5	76	19	15	4	29	26	3	5	48	48	0
85	F	20	169	58	168	85	80	5	67	15	14	1	28	26	2	-18	60	58	2
86	F	21	165	50	165	88	82	6	74	17	15	2	28	27	1	10	45	47	-2
87	F	20	175	50	172	95	93	2	78	18	15	3	29	26	3	3	43	43	0
88	F	20	177	71	175	87	79	8	83	25	18	7	32	26	6	8	47	47	0

Table no. 2: Measurements of the students in 2018-2019

No.	Gender	Age	Height (cm)	Weight (kg)	Span (cm)	Thoracic perimeter (cm)			Waist (cm)	Anterior-posterior diameter (cm)			Transversal diameter (cm)			Anterior Mobility (cm)	Lateral Tilt (cm)		
						Inspir.	Expir.	Difference		Inspir	Expir	Difference	Inspir	Expir	Difference		Right	Left	Difference
1	F	20	160	63	160	94	87	7	81	22	18	5	30	25	5	2	51	46	5
2	F	20	154	49	148	88	85	3	63	21	20	1	28	25	3	0	37	36	1
3	F	21	165	88	163	127	123	4	108	27	22	5	35	32	3	-2	48	50	-2
4	F	20	164	61	153	90	85	5	77	18	17	1	28	26	2	0	41	40	1
5	F	20	170	53	170	81	74	7	69	18	17	1	26	24	2	0	48	48	0
6	F	21	168	59	165	92	88	5	73	21	19	2	28	25	3	-2	39	40	-1
7	F	20	170	56	158	82	75	7	70	19	16	3	27	24	3	16	44	43	1
8	F	20	158	65	164	94	89	5	68	21	20	1	29	26	3	8,5	34	35	-1
9	F	21	180	66	179	86	95	-9	74	19	17	2	28	26	2	-14	47	44	3
10	F	21	159	54	165	63	69	-6	69	19	17	2	27	25	2	-13	34	35	-1
11	F	21	161	60	161	87	82	5	76	19	19	0	27	24	3	5	38	38	0
12	F	23	155	70	161	97	93	4	84	24	20	4	31	29	2	4	38	41	-3
13	F	20	163	78	164	110	108	2	96	23	21	2	34	32	2	-7	45	47	-2
14	F	20	156	47	158	83	78	5	66	18	16	2	25	24	1	5	40	40	0
15	F	21	162	56	160	88	82	6	68	21	18	3	27	25	2	4	38	39	-1
16	F	21	169	64	166	98	92	6	78	21	20	1	30	25	5	16	42	43	-1
17	F	20	166	52	165	86	84	2	64	16	14	2	26	24	2	4	33	37	-4
18	F	20	164	63	165	90	83	7	73	23	20	3	30	24	6	13	35	37	-2
19	F	20	167	60	165	90	83	7	78	22	21	1	29	25	4	-22	44	45	-1
20	F	21	167	46	167	83	76	7	62	18	15	3	25	23	2	6	44	44	0
21	F	21	164	54	167	88	83	5	24	21	18	3	28	26	2	19	46	49	-3
22	F	20	165	65	169	87	81	6	79	21	16	5	31	25	6	10	41	41	0
23	F	20	154	46	149	87	80	7	70	20	17	3	21	20	1	12	39	39	0
24	F	20	176	65	168	87	84	3	80	22	19	3	29	27	2	3	43	42	1
25	F	21	169	69	169	88	84	4	81	22	21	1	33	31	2	-20	48	48	0
26	F	41	161	52	156	87	81	6	80	19	16	3	28	25	3	0	46	46	0
27	F	20	178	62	170	85	78	7	76	19	17	2	26	23	3	17	42	44	-2
28	F	21	162	51	160	87	80	7	75	19	15	4	26	24	2	0	43	45	-2
29	F	22	169	55	165	90	79	11	70	20	17	3	27	26	1	29	42	41	1
30	F	20	155	51	155	92	86	6	70	19	15	4	30	26	4	22	32	33	-1
31	F	20	170	58	160	89	84	5	70	19	18	1	26	25	1	-12	52	54	-2
32	F	20	165	65	156	92	89	3	76	21	20	1	30	29	1	-18	48	47	1
33	F	26	180	67	174	96	93	3	80	21	19	2	30	26	4	6	40	41	-1
34	F	20	169	56	167	89	84	5	72	19	18	1	29	27	2	0	43	48	-5
35	F	20	165	55	166	89	84	5	77	21	17	4	29	27	2	7,5	44	43	1
36	F	20	170	71	170	96	93	3	83	23	22	1	31	28	3	-10	42	48	-6
37	F	20	166	88	166	86	80	6	81	17	16	1	28	26	2	12	41	42	-1
38	F	20	163	45	158	82	77	5	25	18	16	2	25	22	3	-9	51	48	3
39	F	20	171	75	169	102	98	4	87	22	21	1	33	32	1	29	42	39	3
40	F	20	154	54	156	88	83	5	72	20	18	2	26	25	1	28	39	40	-1
41	F	20	168	56	166	94	89	5	73	19	18	1	28	25	3	2	47	47	0
42	F	20	160	68	159	93	88	5	80	23	21	2	31	28	3	-19	50	49	1
43	M	20	184	80	185	92	82	10	85	24	20	4	31	28	3	-10	48	51	-3
44	F	20	164	50	163	87	82	5	65	24	19	5	27	24	3	9	41	40	1



45	M	20	177	73	178	92	89	3	82	20	17	3	32	30	2	-16	52	51	1
46	M	21	169	63	169	95	87	8	75	21	19	2	29	27	3	5	44	45	-1
47	M	20	183	70	175	90	81	9	78	25	19	6	30	25	5	-12	51	52	-1
48	M	20	188	85	186	99	93	6	96	24	20	4	31	29	2	-10	52	54	-2
49	M	21	177	70	176	95	87	8	84	23	20	3	30	28	2	0	46	47	-1
50	M	21	171	61	171	89	84	5	84	21	19	2	31	29	2	3	45	46	-1
51	M	20	178	73	180	98	85	13	76	26	20	6	34	31	3	-9	55	57	-2
52	F	20	172	63	172	91	85	6	77	20	17	3	30	27	3	0	47	49	-2
53	F	21	172	54	174	87	79	8	68	18	16	2	26	25	2	0	46	44	3
54	F	22	171	70	171	95	88	7	78	20	19	1	27	24	3	-10	45	45	0
55	F	20	160	56	158	86	81	5	70	20	18	3	27	24	3	-16	42	48	-7
56	F	21	164	53	161	87	81	6	69	20	17	3	27	24	3	-11	54	53	1
57	M	20	180	82	180	101	98	3	80	25	21	4	33	30	3	-6	54	53	1
58	M	22	179	57	165	89	83	6	62	20	18	2	29	26	3	-18	52	53	-1
59	F	20	167	54	167	75	71	4	69	17	15	2	23	21	2	0	47	48	-1
60	F	21	167	57	159	92	84	8	73	20	19	2	28	24	4	-13	48	47	1
61	F	20	167	58	165,5	96	85	11	69	22	20	3	28	25	3	11	42	44	-2
62	F	21	161	66	162	102	95	7	88	22	20	3	27	25	2	13	43	43	0
63	F	20	151	40	141	79	75	4	59	17	15	2	25	23	2	3,5	43	45	-2
64	F	20	170	53	173	80	72	8	71	21	19	2	27	24	3	21,5	45	41	4
65	F	20	162	62	159	79	72	7	67	18	16	2	25	23	2	-4	39	45	-6
66	M	20	182,5	72	187,5	92	85	7	76	21	17	4	32	30	2	-13	49	52	-3
67	M	21	182	76	177	100	95	5	85	20	17	3	36	31	5	-25	42	42	0
68	M	21	188	87	188	95	90	5	80	21	19	3	32	30	2	-20	53	54	-1
69	M	21	172	76	175	100	93	7	80	21	18	3	31	28	3	-13	46	44	2
70	M	21	188	79	182	97	86	11	82	23	18	5	31	28	3	2	53	53	0
71	M	22	176	75	171	95	93	2	90	22	21	2	31	29	2	-5	55	50	5
72	M	21	182	82	187	100	94	6	82	23	19	4	29	27	2	1	54	54	0
73	M	21	182	82	187	100	94	6	82	23	19	4	29	27	2	1	55	55	0
74	M	20	178	71	178	92	86	7	81	22	20	2	32	30	2	11	47	48	-1
75	M	22	193	79	188	93	83	10	76	20	17	3	32	28	4	-9	56	57	-1
76	M	23	177	94	180	104	97	7	98	26	23	3	34	30	4	-8	49	45	4
77	M	21	187	85	184	99	93	6	83	23	19	4	30	26	4	0	56	53	3
78	M	21	180	67	180	90	87	3	77	21	20	1	31	28	3	6	50	51	-1
79	M	21	187	70	188	91	83	8	79,5	22	20	2	30	25	5	-6	52	54	-2
80	M	22	197	78	192	87	81	7	71	21	17	4	30	27	3	-20	57	59	-2
81	M	21	180	63	178	85	80	5	80	22	20	2	31	30	1	-8	50	50	0
82	M	44	198	87	201	104	96	8	94	26	21	5	35	30	5	-20	50	54	-4
83	M	22	187	85	187	94	90	4	87	27	23	4	34	32	2	0	52	56	-4
84	M	22	178	72	174,5	96	92	4	86	20	19	1	31	29	2	-10	54	53	1
85	M	20	182	73	182	98	91	7	81	25	21	4	31	30	1	21	52	52	0
86	M	23	189	80	191	97	91	6	85	23	19	4	33	29	4	4	52	55	-3
87	M	20	181	82	178	96	93	3	87	26	23	3	31	28	3	-16	53	52	1
88	M	20	191	84	189	99	95	4	82	21	19	2	33	31	2	-20	41	42	-1
89	M	59	182	75	180	103	96	7	91	26	23	3	33	30	3	0	50	50	0
90	M	21	180	89	180	106	96	10	89	26	23	3	35	33	2	13	51	51	0
91	M	21	198	75	194	93	86	7	76	24	21	3	30	27	3	0	56	59	-4
92	M	20	189	71	194	90	83	7	82	23	19	4	33	19	14	0	56	57	-1
93	M	20	198	##	200	134	127	7	121	28	26	2	44	40	4	17	61	61	0
94	M	21	180	72	180	94	85	9	79	21	18	3	31	27	4	10	43	45	-3
95	M	21	185	82	186	96	87	9	82	24	20	4	32	29	3	0	53	52	1
96	M	20	182	75	187	98	91	7	81	21	19	2	21	19	3	0	55	54	1
97	M	19	173	74	172	91	87	4	87	25	20	5	31	29	2	-7	46	47	-1
98	M	21	176	70	175	87	83	4	82	21	18	3	30	26	4	0	53	53	0
99	M	22	170	70	162	96	89	7	84	20	22	-2	31	29	2	0	50	50	0
100	M	21	170	80	168	99	92	7	87	23	19	4	33	30	3	0	50	50	0

101	M	0	180	87	176	99	92	7	96	23	20	3	33	31	2	0	49	49	0
102	M	21	182	70	181	98	90	8	82	23	20	3	30	27	3	0	56	56	0
103	M	21	172	62	164	86	76	10	74	20	17	3	27	24	3	-17	46	47	-1
104	M	21	181	73	186	97	91	7	77	21	18	3	31	29	3	2	44	44	0
105	M	20	189	84	189	94	80	14	80	23	20	3	31	26	5	5	55	55	0
106	M	21	175	77	179	99	96	3	84	23	20	3	34	32	2	-13	46	46	0
107	M	20	175	85	179	98	96	2	89	24	21	3	34	30	4	-5	41	43	-2
108	M	20	170	70	166	89	85	4	81	22	20	2	31	29	2	-13	47	47	0
109	M	21	181	67	186	87	79	8	75	19	15	4	31	28	3	-4	44	44	0
110	M	21	180	66	179	85	78	7	72	22	18	4	26	24	2	-13	40	40	0
111	M	21	178	70	180	93	88	5	80	22	19	3	29	27	3	2	49	50	-1
112	M	20	178	74	180	91	81	10	73	22	19	3	31	27	4	5	52	53	-1
113	M	26	180	68	180	89	83	6	78	20	19	1	31	29	2	-16	52	52	0
114	M	26	183	71	188	94	86	9	79	22	19	3	29	26	3	22	44	44	0
115	M	22	161	70	161	97	93	4	86	22	20	2	33	31	2	-1	44	46	-2
116	M	20	180	75	177	94	88	6	79	22	21	1	31	28	3	16	51	51	0

RESULTS

The collected data was interpreted and statistically interpreted for obtaining different parameters relevant for the study, as per below presentation.

Below are Tables no.3 and no.4, with averages values for the years 2018 and 2019 and Table no.5, with relevant comparisons between the two sets of measurements.

For the university year 2017-2018 we had 88 subjects, out of which 71 males (81.7%) and 17 females (19.3%).

Table no. 3 – Average values for the university year 2017-2018

Age	Height (cm)	Weight (kg)	Span (cm)	Thoracic perimeter (cm)			Waist (cm)	Anterior-posterior diameter (cm)			Transversal diameter (cm)			Anterior Mobility (cm)	Lateral Tilt		
				Inspir.	Expir.	Difference		Inspir	Expir	Difference	Inspir	Expir	Difference		Right	Left	Difference
21.6	179.8	74.7	179.3	94.8	88.3	6.5	82.3	24.3	20.3	4.0	33.1	29.3	3.7	-0.2	46.5	47.1	-0.6

For the university year 2018-2019 we had 116 subjects, out of which 61 males (52.6%) and 55 females (47.4%).

Table no. 4 – Average values for the university year 2018-2019

Age	Height (cm)	Weight (kg)	Span (cm)	Thoracic perimeter (cm)			Waist (cm)	Anterior-posterior diameter (cm)			Transversal diameter (cm)			Anterior Mobility (cm)	Lateral Tilt (cm)		
				Inspir.	Expir.	Difference		Inspir	Expir	Difference	Inspir	Expir	Difference		Right	Left	Difference
21.3	173.4	68.4	172.3	92.6	86.7	5.9	77.8	21.5	18.8	2.7	29.8	27.0	2.8	-1.1	46.7	47.3	-0.5

Table no. 5 – Comparison between the average values

Values	Age	Height (cm)	Weight (kg)	Span (cm)	Thoracic perimeter (cm)			Waist (cm)	Anterior- posterior diameter (cm)			Transversal diameter (cm)			Anterior Mobility (cm)	Lateral Tilt		
					Inspir.	Expir.	Difference		Inspir.	Expir.	Difference	Inspir.	Expir.	Difference		Right	Left	Difference
2019 Averages	21.3	173.4	68.4	172.3	92.6	86.7	5.9	77.8	21.5	18.8	2.7	29.8	27	2.8	-1.1	46.7	47.3	-0.5
2018 Averages	21.6	179.8	74.7	179.3	94.8	88.3	6.5	82.3	24.3	20.3	4.0	33.1	29.3	3.7	-0.2	46.5	47.1	-0.6
Difference 2019 vs 2018	-0.27	-6.37	-6.29	-7.01	-2.24	-1.61	-0.6	-4.43	-2.85	-1.46	-1.39	-3.28	-2.3	-0.91	-0.83	0.23	0.20	0.03

DISCUSSIONS

The average height of the students was 176,63 cm, with an average weight of 71,57 kg. Both values are considered optimum parameters on the growth and development scale and considering the ration weight / height as per Broca standard formula $W = H (cm) - 100$. According to World Health Organization, for a height of 175 cm, the ideal weight for a 20 years old individual is between 58 and 73 kg.

Another formula (W2) used in determining of the optimum weight for individuals over 18 years old is:

$W = 45 + 0,75 (H (cm) - 150)$, where W = weight in kilograms (kg) and H = height in centimeters (cm).

Year of assessment	Average weight from measurements	Ideal Weight (as per Broca formula)	Optimal Weight as per formula W2
2019	68.4	73.4	62.6
2018	74.7	79.8	67.4

Considering the arm span / height ratio

Year of assessment	Average height	Average arm span	Arm span / Height ratio
2019	173.4	172.3	99.3%
2018	179.8	179.3	99.7%

These values shows a normal, harmonious development of the body, as per the standards that indicates that the arm span is equal with the height.

The thoracic perimeter, measured both at inspiration and expiration, indicates an average of elasticity normal for the age and the biological

potential of the assessed students, provided that most of them practice different competition sports (6.1 cm total thoracic elasticity in both years), also relevant for the average of the anterior-posterior diameter (3.55 cm). These parameters indicate a good respiratory function and an optimal elasticity of the thoracic cage.

Waist perimeter

Year of assessment	Average age (years)	Average height (cm)	Average weight (Kg)	Average waist perimeter (cm)
--------------------	---------------------	---------------------	---------------------	------------------------------

2019	21.5	173.4	68.4	77.9
2018	21.6	179.8	74.7	82.3

The abdominal perimeter, however, for the average age and height of 21, 43 years at the height of 176.63 cm and the weight of 71.57 kg is 80.04 cm. This indicates

excess adipose tissue in the abdominal area and a possible metabolic disorder compared to the WHO's optimal parameters for this age.

Year of assessment	Average age (years)	Anterior Mobility (cm)	Average Lateral Tilt right/left (cm)	Tilt Difference right/left
2019	21.5	- 1.1	46.7 / 47.3	- 0.5 cm
2018	21.6	- 0.2	46.5 / 47.1	- 0.6 cm

The representative parameters for mobility shows a reduced mobility, both frontal and lateral. The tilt differences right/left of -0.5 / -0.6 cm are close to the normal value 0. On the other hand, for this age sector these values of lateral tilt indicates a reduced elasticity of the thoracic cage and of the spine, but also a possible scoliotic asymmetry.

We chose from the relationship of proportionality between the anthropometric characters

in the transversal plane (circular dimensions, perimeters) and stature the following more prominent parameters:

Thoracic perimeter – height ratio (Burgsch Goldstein index): Thoracic perimeter x 100 / Height (%)

- Waist perimeter – Height (as per Cordun M, Kinetologie Medicala, Ed. ALL, Bucuresti, 2000): WP X 100 / Height (%)

Year of assessment	Thoracic perimeter / Height Ratio		Waist perimeter / Height Ratio	Erismann index (value for inspiration state)	
	Inspiration	Expiration		Males	Females
2019	53.37%	49.99%	44.87%	6.5	4.5
2018	52.72%	49.11%	45.74%	5.09	4.08

The harmony between the growth in diameter and the growth in length of the body can be studied with Erismann index: Chest proportion index = Thoracic perimeter – Height/2.

The normal values for adult, sedentary persons are 6 cm for males and 4 cm for females. These values greatly differ for children and adolescents in growth period or for the people who practice different sports. In another similar study of Prof. V. S. Yakimovich⁹, the values of Erismann index were studied for students with ages close to the ages of our target group, but for students with overweight problems.

"The action lines of kinetology are multiple, represented by the study of the movement of the human body and its segments in all aspects: anthropological, anatomical, biomechanical, biochemical etc."

Conclusions

The students approached with interests and involvement this study and all express specific accord

in using and interpreting their personal data. Also, they appreciated the practical work with the hand instruments both for self-discovery and for evaluation of their peers, learning evaluation methods and tactics very necessary in the physical therapy profession. Starting from this measurements, together with anamnesis and clinical data, the students learnt how to express a clinical reasoning and to formulate objectives, thus allowing them to choose the most appropriate methods and tools in the physical therapy for the physical therapy program chosen for the pathology in question.

The results of the evaluations also showed important details regarding the growth, the physical and functional development of the students. The students had the possibility to work directly, to study, to know themselves better, to apply into practice the methods and evaluation technics of the presented parameters. Also, they had the chance to learn and practice the exercises required to achieve the major objectives of optimal functioning and development of the body.

“The first and last act of the physician and physical therapist in the process of functional recovery is the evaluation.” (Sbenghe, 2002).

“School is an environment where the children spend a great deal of time, a learning space, where he can socialize, express himself, evaluates” (Pânișoară, 2017), this is the reason for which the quality of the interaction between professor and student is very important.

The seminar classes addressed the topic of the evaluation and were interactive, analyzing, interpreting and evaluating the somatomotor function on both physical growth and development as well as the functional muscular, cardiovascular and respiratory capacity.

The accumulated abilities were materialized by the actual working hours the methods and techniques for assessing the above parameters were implemented, so that students acquire knowledge of anthropometric features, anthropometric dimensions, and proportionality relationships characteristic of different body segments.

We mention that this study is an n-going project for a much longer period of time than these 2 years, intended to cover a total of 10 years and generations of students. Collected data for this period will offer a greater possibility to have statistical relevant data, to identify trends in young students body development and to offer to the students the chance to practice these evaluation methods. We remain open to further collaboration and suggestions in our endeavor.

REFERENCIES

- Blendea C. D., Iordache L., Modulated radiofrequency therapy in medical rehabilitation, *Balneo Research Journal*, 2016, Supplement vol. 7, no. 3.
- Bratu M., Bazele generale ale kinetoterapiei, Ed. BREN, Bucuresti, 2011, p. 7.
- Cordun M., Postura corporala normala si patologica, Ed. ANEFS, Bucuresti, 1999, p. 2.
- Cordun M., Kinetologie medicala, Ed. ALL, Bucuresti, 2000.
- Ciolcă S., Grigore G., Fotbalul - mijloc asociat al kinetoterapiei, Editura Cartea Universitară, București, 2005, p.13.
- Moanța A. D., Bălan V., Bejan R., Geambașu A., Grigore A., Activități competiționale la copii cu deficiențe mintale, Ed. Cartea Universitară, 2006, p. 5.
- Sbenghe T., Kinesiologie știinta mișcării, Ed. Medicală, București, 2002, p. 397.
- Pânișoară O. I., Ghidul profesorului, Ed. Polirom, București, 2017, p. 87.
- V. S. Yakimovich, professor, Dr.Hab. “Correlation of health and physical fitness indices of student youth with overweight” Magazine “Teoryia I praktika fizicheskoi kultyry”
<http://teoriya.ru/en/node/277>