

EFFECT OF PARTIAL SPORTS MASSAGE ON BLOOD PRESSURE AND HEART RATE

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Annotation. With the growing popularity and demand for different types of massages (including sports) is a growing need for research on specific forms. There is also a need to study the advantages and effects on various body functions. The objective was to study the effect of partial sports massage on blood pressure and heart rate in both men and women. *Material and methods.* Research has been extended 80 healthy men and women are physically active (age 20-25 years). Blood pressure and heart rate were made on the left arm automatic digital device (model HEM - 907). The device is intended to measure blood pressure. It is established that it is possible to verify the existing beliefs. This promotes more efficient use of massage therapy. *Conclusions.* Sports massage has an effect on hemodynamic changes, the increase (decrease) in blood pressure acceleration (deceleration) of the heart rate. It depends on what part of the body exposed to the massage procedure.

Keywords: sports massage, hemodynamic, systolic, diastolic, blood pressure, heart, rate, muscle.

Introduction

Alongside with increasing demand in different massages, including sport massage, and their popularity, demand in researches of definite massage forms, considering their influence on different organism functions, also grows [1, 3, 11, 13]. Researches of sport massage's influence are, at present, carried out by group of scientists, who concentrate on receiving the best results [3, 11, 12, 13, 15]. Researches under guidance of professor of anaesthesia department of Louisiana university of medical researches in New Orleans (USA) resulted in determination of deep tissue massage's influence on such indicators as systolic and diastolic blood pressure. In experiment 263 volunteers participated (12% of men and 88% of women), every of whom had complaints on deformations or muscular spasms. Massage sessions lasted from 45 to 60 minutes. BP indicators were measured before and after massage. Reducing of systolic pressure was in average 10.4 mm Hg, diastolic - - 5, 3 mm Hg, reducing of arterial pressure - 7, 0 mm Hg; also pulse reduced by 10.8 b.p.m. These results showed high correlation between deep tissue massage and BP and pulse reducing that promise successful realization of massage as supplementary methodic in curing of hyper-tension [4]. Researches of world known scientists prove that the higher growing of workability of definite parts of body takes place after 10 minutes' massage. If to increase massage time to 50 minutes – workability reduces. Besides, in experiments a thesis was formulated that the highest workability results not from massage of muscles, which are tired after work., but from massage of muscles, which were not used in work, or were loaded a little [2, 12]. R. Valshek, who tested group of 10 men, massaged back and lower limbs in order to determine influence on massaged body fragments. Hid research stated that haemo-dynamic indicators depend on what part of body was massaged B [14].

Purpose, tasks of the work, material and methods

The purpose of the work was studying of partial sport massage's influence on BP and pulse indicators of men and women.

Material and methods of the research. The research covered 80 healthy men and women of 20-25 years old, who were physically active. BP and heart beat rate measurements were carried out on left hand with device of Japan company OMPON. This was automatic digital device, designed for measuring of BP – HEM-907. Before and after every massage we controlled pulse and BP. Sport massage was fulfilled on upper limbs (biceps, triceps) and on lower limbs (back and front sides of thigh, back side of shin) during 20 minutes in the morning by one and the same massager.

Statistical methods of data processing: was carried out with help of program package Statistica PI (v. 10 Stat Soft). Statistical significance is presented in bold type in the article. The following abbreviations were used: UL – upper limbs, LL – lower limbs. Statistical analysis of results is presented in the form of tables.

Results of the research and their discussion

Basing on the fulfilled research we can make conclusion that systolic pressure before UL massage, in comparison men-women, is statistically differentiated as $P=0.0420$, after massage also statistically significant $P=0.0082$ was registered. At the same time after LL massage statistically significant systolic pressure is observed only after massage $P=0.0096$. Dispersion analysis for multiplication factor of measurements (sex – x, massage – x, multiplication factor – R1) shows that sex is the only factor, which statistically significantly differentiate systolic arterial pressure and has $p<0.0008$. Arithmetic mean and probability's degree for LSD tests (post factum test of the least significant differences) before and after massage are presented in table 1 by factors: sex x, limb x, multiplication factor.

Table 1.

Arithmetic mean and degree of probability for tests LSD (post factum test of the least significant differences) before and after massage are presented in table 1 by factors: sex x, limb x, multiplication factor

Description	Comparing of the least LSD differences with post factum test, value p											
	Before-after massage				UL - LL				Men-women			
	men		women		men		women		UL		LL	
	UL	LL	UL	LL	Before massage	After massage	Before massage	After massage	Before massage	After massage	Before massage	After massage
Systolic pressure	0. 6584	0. 1179	0. 4174	0. 5860	0. 8040	0. 9121	0. 2630	0. 0583	0. 0420	0. 0082	0. 0749	0. 0096
Diastolic pressure	0. 2080	0. 8524	0. 8379	0. 8446	0. 1459	0. 7031	0. 9671	0. 8298	0. 3842	0. 8197	0. 3114	0. 4394
Pulse	0. 4062	0. 1141	0. 9521	0. 2213	0. 1585	0. 6937	0. 6022	0. 9202	0. 1620	0. 3447	0. 5798	0. 4386

Systolic pressure of men and women significantly differs before massage ($P=0. 0093$) and after massage statistically significant difference is $P=0. 0003$. Arithmetic mean and degree of probability for LSD tests (post factum test of the least significant differences) are in table 2 by criteria: sex and multiplication factor.

Table 8.

Arithmetic mean and degree of probability for LSD tests (post factum test of the least significant differences) by criteria: sex and multiplication factor.

Description	Group mean				Post factum comparison with LSD test, value p			
	men		women		Before-after massage		Men-women	
	Before massage	After massage	Before massage	After massage	men	women	Before massage	After massage
Systolic pressure	131,91	135. 32	123. 55	123. 55	0. 1182	1. 0000	0. 0093	0. 0003
Diastolic pressure	76,64	77. 50	75. 71	75. 76	0. 6157	0. 9610	0. 6729	0. 4294
Pulse	76,50	74. 96	77. 29	78. 38	0. 3569	0. 2935	0. 7888	0. 2489

Women's systolic pressure significantly increases after LL massage and reduces after UL massage. Quite opposite results are of diastolic pressure, which reduces after LL massage and increases after UL massage. Men's systolic pressure a little increases after LL massage and reduces after UL massage. After UL massage women's pulse increases but after LL massage remains at initial level, like before massage. Men's pulse reduces after UL massage and insignificantly increases after LL massage. Results are presented in table 3.

Table 3.

Statistical characteristics of haemo-dynamic indicators, which were examined by criteria: different massages and sex (men-women)

Description	Sex	Масса	N	Before massage						After massage					
				\bar{x}	s	v	Min	Max	Range	\bar{x}	s	v	Min	Max	Range
Systolic pressure [mmHg]	W	UL	40	124. 80	10,27	8.23	101. 00	147. 00	46. 00	125. 68	13. 33	10, 61	100. 00	161. 00	61. 00
		LL	18	120. 78	11.01	9.11	91. 0	137. 00	46. 00	118. 83	10. 86	9, 14	104. 00	152. 00	48. 00
	M	UL	16	131. 50	11.75	8.93	105. 0	149. 00	44. 00	135. 50	16. 64	12, 28	104. 00	169. 00	65. 00
		LL	6	133. 00	18.85	14.17	105. 00	160. 00	55. 00	134. 83	14. 08	10, 44	121. 00	159. 00	38. 00
Diastolic pressure [mmHg]	W	UL	40	75.68	9.55	12.62	56.00	97.00	41. 00	75.93	7.91	10, 42	59.00	90.00	31. 00
		LL	18	75.78	6.28	8.29	63.00	85.00	22. 00	75.39	9.11	12, 08	61.00	95.00	34. 00
	M	UL	16	78.31	10.16	12.97	60.00	96.00	36. 00	77.94	9.04	11, 59	60.00	90.00	30. 00
		LL	6	72.17	11.21	15.54	62.00	92.00	30. 00	76.33	6.44	8, 44	70.00	85.00	15. 00
Pulse (b.p.m.)	W	UL	40	76.75	14.05	18.31	44.00	113. 00	69. 00	78.28	12. 14	15, 51	57.00	106. 00	49. 00
		LL	18	78.50	8.58	10.93	64.00	94.00	30. 00	78.61	8.25	10, 49	66.00	91.00	25. 00
	M	UL	16	78.69	12.72	16.16	54.00	101. 00	47. 00	75.56	10. 79	14, 29	60.00	95.00	35. 00
		LL	6	70.67	11. 43	16.18	57.00	86.00	29. 00	73. 33	9. 37	12, 78	60.00	84.00	24. 00

It is well known that physical load results in changes in cardio-vascular system, at the same time influencing of heart functioning [2, 8, 9, 10, 15]. On the base of our work we can make conclusion that sport massage influences on indicators of systolic and diastolic pressure and on pulse frequency of men and women, who are physically active [9, 3, 6, 11]. Researches of prof. Jerrilyn A. Cambron, which were carried out at National Scientific Institute of massage therapy in Lombard (USA), contained comparative works on testing of blood pressure before and after therapeutic massage. Besides, they controlled changes, which happened in human body, and analyzed factors, which influenced on these changes. That research embraced group of 150 adult persons with BP indicators not higher than 150/95, who regularly practiced therapeutic massage. It has been established that some demographic differences, such as young age and small height, influenced on decreasing of systolic BP (Trigger Point Therapy) [3]. The highest indicators of systolic BP's increasing was registered with application of dotted massage. This kind of massage can cause organism's pain response and, thus, increase neuron activity and increase BP. Application of both sport and dotted massage resulted in increasing of BP [3, 4, 6].

Applying Swedish massage we noticed reduction of systolic BP, however, these data are not statistically significant. In this research there is no determination of dependence between BP changes and parts of body, which were massaged and no attention was paid to time and strength of massage pressing [5, 3, 7].

The researches, which had been conducted by Tesse Hinds in Center of clinical and bio-physical researches at Manchester Metropolitan University (Great Britain) were concentrated on comparison of massage and passive rest after series of intensive exercises influence on musculus quadriceps femoris. They regarded the following criteria: increasing of blood flow's velocity, hypodermic blood flow, temperature of skin and muscles. Increasing of arterial blood flow velocity would influence on satiation of muscular tissue with oxygen, which had been under load before examination, and, thus, should have speed up regenerative process. In that research 13 men took part. Measurements were carried out before exercise, immediately after exercise, in the middle of passive or active, i.e. massage, regeneration and immediately after finishing of regeneration. It turned out that massage was not a factor, which increased velocity of arterial blood flow and did not influence on temperature of muscles. Only temperature of skin and hypodermic blood flow were significantly increased. In the author's opinion results of the researches cause doubts in effectiveness of massage as muscular recreation after physical load. Local improvement of hypodermic blood micro-circulation with, at the same time, absence of arterial blood flow velocity influences in such way that blood circulation in skeleton muscles would slow down their regeneration [2].

The task of researches, which were carried out by School of Physiotherapy in Stockholm was determination of influence of Swedish massage on blood pressure, considering differences between massage of back, neck and chest (BNCh) and legs, arms and face (LAF). They assumed that owing to sensor stimulation in massage form, there appear such changes in neurons, which influence on such functions of nervous system, like, for example arterial blood pressure. Systolic BP increases under string pressing, while diastolic – only after many times' and long term pressing. Except sensor criteria here also psychological factors play role. Twelve-week's period of the research was divided into 3 four-week's phases. In 1st and 3rd phases participants were exposed to two 30-minutes massages, in 2nd phase they did not participate in experiment. At the beginning of the researches it was selectively determined who will be exposed to BNCh and LAF and in what phase. BP was measured before and after massage sessions. Immediately after massage, I 1st phase, groups, which were exposed to BNCh massage showed reduction of systolic BP by 6%, while in group, which underwent LAF massage, - by 4%. In 2nd phase, after BNCh massage systolic BP decreased by 8%. After 1st phase, with BNCh massage, diastolic pressure before session reduced, in average, by 15% and after session – by 6%. In each phase, in spite of massaged parts of body, they registered direct influence on reduction of systolic pressure after massage. However, influence of massage on diastolic pressure was observed only after 6 weeks of sessions [5]. As we can see massage is used with different kinds of therapy. Progress of civilization, development of sciences and medicine call researchers for further conducting of scientific researches, devoted to massage, as far as it is a technique, rendering positive influence on human organism [1, 2, 3, 4, 5]. The presented above experiments point that it is worth to go deeper in field of massage knowledge, meaning not only sport massage. Owing to researches it is possible to test existing ideas about massage that will surely facilitate its more effective application in therapy.

Conclusions:

1. Sport massage influences on haemo-dynamic indicators, increasing or decreasing of BP as well as on rising or reducing of heart beats rate, depending on what part of body is exposed to massage [14].
2. Owing to present research it is possible to test existing ideas about massage that will surely facilitate its more effective application in therapy.

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