INTEGRATIVE TECHNOLOGY OF MASSAGE MANIPULATIONS IN PHYSICAL REHABILITATION OF STUDENTS WITH BACKBONE PATHOLOGY

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Abstract. *Purpose:* to analyze effectiveness of massage manipulations' integrative technology in physical rehabilitation of higher educational establishments' students with backbone pathology. *Material:* in the research 195 students of 19-20 years' age participated. All students had periodical initial neurological symptoms of functional pathology and first stage osteochondrosis in different parts of backbone. We conducted a course of 10 sessions of therapeutic massage. *Results:* the sense of massage integrative technology is that every specialist shall have certain optimal set of skills and knowledge in technique of manipulation sessions of massage. Integrative technology of massage manipulations consists of psycho-corrective and manipulation parts. It considers psycho-somatic, mechanical and reflex rehabilitation aspects of patho-genesis of backbone functional disorders and vertebral osteochondrosis. *Conclusions:* depending on pathological process or backbone functional state of every person (peculiarities of his (her) psycho-somatic status or, even, his (her) bents). Individual approach in choice of strategy, tactic and methodological provisioning of massage session shall be used.
Key words: physical rehabilitation, vertebral osteochondrosis, pathology of backbone, massage technologies.

Introduction

Increase of rehabilitation effectiveness with neurological manifestations of vertebral osteochondrosis, which take first places by ubiquity and long term loss of workability in structure of population's neurological morbidity (70–80%), has high social economic significance [2; 9; 12; 15; 19]. Owing to implementation of new, patho-genetically conditioned rehabilitation technologies the situation can be changed to better one. Nowadays, great attention is attracted by quick increase of backbone functional disorders and vertebral osteochondrosis (dorsopathy) morbidity among youth and junior age people, who suffer from vertebral neurological pain syndromes. [7; 13; 14; 16]. Of special trouble are backbone disorders in students. For example, in 70-80% of young people, entering higher educational establishments, there are disorders of carriage, in 20% - different deformations of backbone. During first three years of studying at higher educational establishments the quantity of students, related to main health group, reduces twice [4; 7]. After graduation from HEE most of students' backbone disorders transform into degenerative-dystrophic diseases of backbone. The combination of the outlined realities forces to seek the ways of modernization, optimization of health related technologies and physical rehabilitation of young generation with functional disorders and initial symptoms of backbone diseases, among which massage technologies take important place.

Hypothesis: differential application of different massage techniques within one rehabilitation session shall consider main principles of manipulation, phases of rehabilitation process, character of functional and reflex changes in patients; degree of vertebral pathology's expressiveness and individual features of rehabilitants' psycho-somatic state. Such approach shall increase physical rehabilitation effectiveness of youth with neurological symptoms of backbone first stage osteochondrosis by classification of V.Ya. Fishchenko [12].

The purpose of the works is to analyze effectiveness of massage manipulations' integrative technology in physical rehabilitation of higher educational establishments' students with backbone pathology.

Material and methods

Participants: the research was carried out on the base of problem laboratory of health related rehabilitation technologies of physical culture scientific research institute (Sumy State Pedagogical University A.S. Makarenko). In our research we tested and rehabilitated 195 of 19-21 years' age (the course of 10 therapeutic massage sessions) with functional disorders of backbone and initial symptoms of vertebral osteochondrosis. All students had periodical initial neurological manifestations of functional pathology and first stage osteochondrosis in different parts of backbone (by classification of V.Ya. Fishchenko) [12]**.** Among symptoms of backbone diseases there prevailed: unexpressed pain syndrome or discomfort in cervical thoracic and lumbar spine.

Organization of the research: all tested were divided into six groups, equal by clinical symptoms and localization of pathological processes. With it 33 students passed rehabilitation by improved rehabilitation methodic with application of integrative massage technology. 34 passed rehabilitation by common rehabilitation therapeutic classic massage. 34 passed rehabilitation with elements of ajurvedic massage. 32 students passed rehabilitation with elements of Chinese massage. 33 students passed rehabilitation with elements of Tibetan massage. 29 students passed rehabilitation with elements of Egyptian massage. Integrative technology of massage manipulation in physical rehabilitation consisted psycho-corrective and manipulation parts. It considered psycho-somatic, mechanical and reflex rehabilitation aspects of backbone functional disorders' pathogenesis as well as vertebral osteochondrosis.

http://dx.doi.org/10.15561/18189172.2016.0305

Statistical analysis: for statistical analysis we used commonly accepted methods of received data processing with the help of Fisher-Students' T-criterion and standard package "Statistica" in EXEL 2000 (M±δ), non parametrical methods of information processing (determination of Fisher's angle coefficient).

Results of the research

Integrative massage technology was oriented, first of all, on fighting with functional disorders, which accompany vertebral pathology. In manipulation techniques of complex therapeutic influence on human organism it is purposeful to regard functional disorder, dividing all syndromes into two categories. First category of syndromes (*pressing-tension)* relates to limitation of joints' mobility, determination of joints' functional blocks, hyper tonus of muscles, feeling of psychic tension and fascia restriction, shiver, Yin syndrome. The second category of syndromes *(stretching-relaxation)* relates to non stability and loose of joints, hypotonia of muscles, feeling of psychic rest and relaxation as well as fascia stretching, increase of temperature at local parts of body, Yan syndrome.

The method of differential structural therapeutic massage session's construction was based on careful study of different massage systems and techniques. Its structure includes principles of classic therapeutic massage and main techniques of different western and oriental massage systems. We came to conclusion depending on psycho-somatic state and even bent of every person, individual approach to selection of strategy, tactic and methodological provisioning of massage effectiveness shall be applied. Every session of therapeutic massage by integrative technology correlates with phases of rehabilitation process. The session consists of basic and variable parts.

Manipulation session shall be preceded by certain psychological preparation; with it, this in equal degree concerns both rehabilitant and rehabilitation specialist. Before session and in the process of therapeutic massage session and manual therapy it is necessary to use psycho-correction methods. It can be soulful talk, application of autogenic training methods, body oriented therapy, NLP (neuro-linguistic programming) and Erickson's hypnosis. Depending on rehabilitant's religious belonging, or its passion to oriental philosophy prayers or Indian mantras can be used (as method of psychological preparation and relaxation). One or another psycho-correction method shall be selected, considering individual characteristic features of a person and his (her) wishes [2; 21].

Manipulation part of therapeutic massage is composed with the help of differential structure of therapeutic massage session on the base of classic therapeutic massage and main techniques of different western and oriental massage systems. With it, when practicing massage techniques it is necessary to observe certain rules and principles of integrative technology:

1) Consider rehabilitant's psychological state (principle of psycho-somatic orientation);
2) Orientation on main syndrome (principles of seeking main syndrome);
3) All rehabilitation specialist's manipulations shall be realized in his relaxed state from his mass center (most often from lower part of abdomen) (principle of relaxation);
4) All manipulations shall be spiral-like (principle of spiral-like movements);
5) Session shall always be started from surface acting techniques and their action on tissues shall be gradually deepened (principle "from surface to depth");
6) Principle "from periphery to center" shall always be observed: i.e. first mechanical actions shall be fulfilled on painless zones and then, gradually be approached to pain epicenter;
7) Special attention shall be paid to transitive parts of backbone; manipulations on these parts shall be longer and more intensive (principle of special attention to transitive parts of backbone);
8) Principle "exclusion of static-dynamic loads on affected part of vertebral motor segment (VMS) shall always be observed;
9) It is necessary to stimulate activity of backbone muscles, which ensure defensive function of affected VMS;
10) It is necessary to ensure rehabilitation influence on vertebral and extra vertebral affected zones, considering reflex interconnections (principle of reflex chains);
11) It is necessary to use techniques of perinatal relaxation, imitation of breathing and movements, characteristic for perinatal states (principle of perinatal states' searching);
12) It is necessary to use effect of actions' summarizing, i.e. actions of targeted influences on skin, muscles or joints for fighting with functional disorders (principle of summarizing of techniques, based on adaptation theory, actively used in Spain massage system). It is necessary to ensure gentle character of therapeutic actions.

In our opinion, manipulation part of every massage session shall have four or five structural parts.

1. *Therapeutic massage* (surface acting with Zakhar'in – Ged's correction of skin parts). "Dry" massage or massage with application of little quantity of baby powder (talc, massage creams) is fulfilled. If the procedure is of cosmetic character cleanings can be used. Main physiological influence of this part of rehabilitation session envisages improvement of patient's skin, calming impact on nervous system, release of fatigue and slight nervous reflex influence on all systems of human organism.

2. *Therapeutic massage* (deep massage with correction trigger and periosteal zones). This massage (as a rule with oil) implies detail work with the so-called trigger zones (hyper-tonus, muscular contractions). Specific feature of

this part is also carful work with ligaments and joints. Accordingly it is normalization of muscular tonus and joints' work. This part of massage is mainly of prophylaxis and therapeutic character.

3. *Reflexive massage* can include techniques of classic massage, oriented on more intensive influence on reflex zones, according to certain diseases. Besides, it includes: techniques of segment-reflex, combined tissue-periosteal massage; acupressure reflexology massage in compliance with oriental massage systems (Chinese, Indian, Tibetan, Thai and other). This is the most variable part of massage session, which, in many cases, depends on specificities of rehabilitant's disease, his (her) backbone functional state, experience and special knowledge of rehabilitation specialist.

4. *Elements of manual correction:* are not compulsory part of therapeutic massage, but its application is rather popular and purposeful in therapeutic and prophylaxis influence on human muscular skeletal apparatus in one rehabilitation session. Practically there is no clear difference between passive movements of some therapeutic massage methodic and manual therapy elements. In our opinion all techniques of examination, mobilization and manipulation are taken from manual therapy methodic. They shall be fulfilled in spiral-like way and be gentle. Main purpose of manual therapy application is release from functional blocks and restoration or improvement of joints' mobility.

5. *Relaxation* is a finalizing part of therapeutic massage session. This part is oriented on ensuring of pleasant for rehabilitant rest. It is composed from intermittent and continuous vibrations' techniques, surface stroking, calming procedures. Finalizing part is recommended by us to include elements of cosmetic massage and elements of autogenic training.

According to mentioned above recommendations and peculiarities of psycho-somatic state and morphological functional changes of rehabilitant's tissues certain set of massage techniques shall be used. The basis of massage session shall be classic therapeutic massage. We think that special attention in therapeutic massage session shall be paid to main techniques of classic massage. When training massage specialists, classic techniques shall be mastered up to automatic level. Concerning additional techniques, certain variable set of techniques can be applied. Among them additional techniques of classic therapeutic massage can be used as well as basic and supplementary methodic of different oriental and western massage systems. Selection of additional massage techniques for application to every definite rehabilitant is realized as per parameters of rehabilitant's somatic state [7; 18; 20]:

a) constitution of rehabilitant: it is recommended to use differentiated approach to intensity massage procedures and massage oils' usage, depending on types of personality; it is used in ajurvedic and Tibetan medicine (type of constitution: *vata dosha* – wind, *pitta dosha* –bile, *kapha dosha* –mucus). For constitution *vata dosha* more calming, surface oil massage is used; for *pitta dosha* – harmonizing; more intensive (deep) with less quantity of oil is used for для *kapha dosha* [11; 22];

b) Characteristics of backbone functional state, character of pathological process (if it takes place), character of clinical symptoms of backbone disease (for example pain syndrome of para vertebral segment has reflex or spine character), stage of pathologic process and etc. shall be considered.

c) The following changes of rehabilitant's muscular system shall be considered: increased or reduced muscular tonus, presence of muscular contractions and their characteristics by size, pain, density and so on;

d) Changes of mobility in separate joints and vertebral motor segments, presence of functional blocks (their localization, expressiveness and other characteristics) shall be considered.

In general changes of dynamic motor stereotype are assessed. Besides, there continues search of those techniques, which would be the most physiological, gentle and rational. They will correspond to the most effective and bio-mechanically based influence on soft tissues' state and muscular skeletal apparatus. The purpose of such influence is liquidation of pathologic changes and improvement of backbone functional state.

Selection of massage techniques depends also on subjective factors: ability to use certain set of methodic and techniques; any habits or bents to use certain massage techniques by rehabilitation specialist. Alongside with it every rehabilitation specialists shall have skills in classic therapeutic massage and have arsenal of techniques of oriental and western massage systems. Every massage session shall be a kind of creative process, a kind of litmus test – check up of rehabilitation specialist's knowledge and skills. In every session of therapeutic massage there is basic part which is composed of classic therapeutic massage techniques. To some extent it is both unchangeable and variable. It can include supplementary techniques of classic massage and other oriental and western systems. Variable part is composed, depending on objective factor (rehabilitant's constitution, his (her) psycho-somatic state, functional state of backbone) and subjective factor: knowledge and skills of rehabilitation specialist (see table 1). In our own practice we rather often supplement classic therapeutic massage techniques with techniques of Chinese, ajurvedic, Tibetan and Egyptian massage [1; 5; 6; 10; 11; 22].

For reflex influence and manual correction with appropriate indications we use elements of Thai massage [8]. The most often they are different rotations in vertebral motor segments, fulfilled against the background of tractions. As a rule they are fulfilled in spiral-like way.

Among techniques of Chinese massage we used often such techniques as: strokes (*tui*), pressure (*an, tsia*), pinching (*nye, na*), rotation (*ju*), tapping and clapping (*shui, na, tsu*), stretching with rotation*yao*), vibration (*zeng*)

[10]. We determined certain techniques of ajurvedic massage (in particular such as ab'yanga and marma-massage), which were used in integrative technology of massage:

1) differentiated application of massage oils;

2) application of certain ajurvedic techniques of massage on back and back part of upper and lower limbs (specific techniques such as rotational stroking, deep palpation of soft tissues, pressure);

3) acupressure of marma zones (parts with increased reflex sensitivity) [1].

Besides, we used in our practice Tibetan massage techniques [5]: surface "brushing away" (*shud nye*); surface longitudinal stroking (*thil nye*); rotational stroking (*cor nye*); pressure (*non nye*); "digging" (*shog nye*); stretching (*then ded*); acupressure (*sang ney*); slight tapping (*ded nye*); sliding and pinching (*pag nye*); five fingers' technique (*sor nye*).

Specificity of Egyptian massage is variety of massage manipulations, which include tender touches by finger tips, deep sliding by palms and many other [10]. There is an assumption that first massage techniques resulted from watching over animals. By the way, this assumption is confirmed by names of some Egyptian techniques, associated, to some extent, with natural phenomena, animals' movements or myth heroes [6]. For example, different stroke techniques have rather exotic names: "waves", "crab", "Lotus branch", "bird"s paw", "cat's paw". Not less original names rubbing techniques have: "seashell", "scarab", "crocodile". Some rubbing techniques resemble animals' movements: "goose", "worm". Some names of massage techniques are connected with mythology. Linear stroking by both hands, starting from foot fingers, along all body and finishing on hands' fingers and in reverser direction, is called (stroking Isis). Technique, which in classic massage is called single kneading, in Egyptian massage is called "Delight Thoth", double kneading – "Double delight Thoth", pressing out - "Seth girth". Undoubtedly, in the given below table we showed only the most frequently used methodic (see table 1).

Table 1. Therapeutic massage with integrative technology

Basic part of therapeutic massage techniques	**Additional variable part of western and oriental therapeutic massage systems**				
Main techniques of classic therapeutic massage	*Kinds of main massage techniques*	*Kinds of Chinese massage techniques*	*Kinds of ajurvedic massage techniques*	*Kinds of Tibetan massage techniques*	*Kinds of Egyptian massage techniques [6]*
1	*2*	*3*	*4*	*5*	*6*
Stroking: surface; emracing	Stroking: comb-like; pinching-like; cross-like; smooth	Stroking techniques (tui)	Specific rotational stroking	Surface "brushing away" (shud nye) Surface longitudinal stroking thil nye); rotational stroking (kor nye)	Stroking techniques with exotic names: "waves", "crab", "Lotus branch", "bird's paw", "cat's paw"
Rubbing: "sawing", rake-like	Rubbing: comb-like, pinch-like, cross-like; rubbing by palm, by thumb, (by 2^{nd} -4^{th} fingers, by palm base,				Rubbing techniques: "seashell ", "scarab", "crocodile"

	by fists, forearm; by thumb with load)				
Kneading: longitudinal, cross-directed	Kneading: single kneading, drugging, shifting, pressing out, clips-like, clench-like, pressing, pulling	Pressing (an, tsia), pinching (nye, na), rotation (ju), Stretching with rotation (yao)	Pressing, deep palpation of soft tissues, acupressure of marma zones	Pressing (non nye); "digging" (shog nye); stretching (then ded); acupuncture (sang ney).	Kneading techniques, resembling animals' movements: "goose", "worm", "Delight Thoth", "Double delight Thoth", pressing out – "Seth girth"
Vibration, "hewing"	Vibration Crossing , shaking, strong shaking over	Tapping and clapping (shui, na, tsu), vibration (zeng)		Slight tapping (ded nye); sliding and pinching (pag nye); Five fingers' technique (sor nye)	

Besides, some techniques of Sweden massage can also be included – stroking and rubbing in spiral like way (effleurage, petrifaction) as well as lymph drainage massage of Pascal- Caushet with specific pressing along all body in direction of lymph nodes. In this list we can include certain specific techniques of Vietnamese massage, Turkey massage, Bali, Spain, French wave-like massage. Recent times even Ukrainian and Russian spa massages have been mentioned.

We tried to mark out the most ancient and wide spread massage techniques. Alongside with it we think that every rehabilitation specialists shall have his (her) own tables. In these tables, alongside with already mentioned techniques, there shall be columns with techniques mastered personally by rehabilitation specialist. The sense of integrative technology is that every specialist shall have certain optimal set of knowledge and skills in massage manipulation techniques. It will permit for rehabilitation specialist to realize differentiated approach to functional disorders, accompanying vertebral pathology.

Effectiveness of rehabilitation will, to some extent, depend on rehabilitation specialist's professionalism. Alongside with it, accurate application of manipulation therapeutic principles and certain algorithm of rehabilitation actions will inevitably facilitate increase of rehabilitation effectiveness.

At second stage of our research we analyzed effectiveness of integrative massage technology.

Psychological status of the tested was assessed on the base of talks with students. The talks were oriented on determination of students' responding, character of attitude to surrounding, presence of psycho-traumatic situations, attitude to disease, psycho-diagnostic methods. Study of positive influence on rehabilitants' psycho-emotional state with the help of different massage techniques was practiced before, in the middle and after rehabilitation course (10 massage sessions). Psycho-emotional sphere was tested with Luscher's test. It gives valid analysis of human psycho-emotional sphere and is often used for determination of psycho-emotional state with vertebral pathology [2; 21]. When interpreting Luscher's test results we analyzed location of main and auxiliary colors, considered the data of talks with the tested (see table 2).

Table 2. Dynamic of testing indicators (by Luscher) in rehabilitation of students with neurological symptoms of vertebral osteochondrosis of first stage, different technologies and therapeutic massage methodic being used

Rehabilitation groups	Period of testing	Total deviation from autogenic norm (mean indicators in points)	Vegetative coefficient (mean indicators in points)
Rehabilitation with integrative massage technology (n=33)	Before rehabilitation	16.7±1.04	0.62±0.08
	In the middle of rehabilitation course	8.45±0.55	1.25±0.07
	After rehabilitation	*3.1±0.54	*1.49±0.05
Treatment with commonly accepted techniques of therapeutic massage (n=34)	Before rehabilitation	16.42±1.21	0.71±0.06
	In the middle of rehabilitation course	12.65±0.82	0.92±0.09
	After rehabilitation	*9.35±1.02	*1.03±0.07
Improved massage methodic with elements of traditional Chinese massage (n=32)	Before rehabilitation	16.6±1.38	0.65±0.07
	In the middle of rehabilitation course	9.3±0.92	1.19±0.06
	After rehabilitation	*7.6±0.81	*1.42±0.07
Improved massage methodic with elements of traditional ajurvedic massage (n=34)	Before rehabilitation	16.64±1.28	0.7±0.09
	In the middle of rehabilitation course	10.44±0.84	1.19±0.07
	After rehabilitation	*5.23±0.64	*1.49±0.05
Improved massage methodic with elements of traditional Tibetan massage (n=33)	Before rehabilitation	16.2±1.18	0.72±0.07
	In the middle of rehabilitation course	10.3±0.92	1.04±0.08
	After rehabilitation	*6.5±0.72	*1.45±0.08
Improved massage methodic with elements of traditional Egyptian massage (n=29)	Before rehabilitation	16.48±1.26	0.68±0.08
	In the middle of rehabilitation course	9.59±0.82	1.19±0.07
	After rehabilitation	*5.68±0.95	*1.47±0.07

* Confident difference of indicators between groups "before" and "after" rehabilitation ($p<0.05$)

This testing showed that at the beginning of the research psychological state in all groups had negative tendencies: 82.4% of the questioned had expressed reduced mood, feeling of aggression, uncertainty in own actions.

We considered mean indicators of total deviation (TD) from autogenic norms in points in control and main groups, as well as vegetative coefficient (VC) at the beginning, in the middle and at the end of rehabilitation course. Practically in all groups we received positive confident changes ($p<0.05$). After rehabilitation, rehabilitants were in state of satisfaction, relaxation, had wish to communicate. Though, indicators of groups differed greatly. Indicators of psycho-emotional sphere after rehabilitation course by integrative technology (TD – 3.1±0.54; VC – 1.49±0.05) were better than indicators of other groups. In other groups other different massage methodic were used: (Chinese -TD– 7.6±0.81; VC – 1.42±0.07; ajurvedic: TD– 5.23±0.64; VC – 1.49±0.05; Tibetan: TD – 6.5±0.72; VC – 1.45±0.08;

Egyptian massage: TD – 5.68±0.95; VC – 1.47±0.07) (table 2.) We analyzed results of massage methodic influence on rehabilitants' psycho-emotional state by complex of psycho-diagnostic tests. It was found that in 30 rehabilitants of main group (90.9%) significant positive influence on psycho-emotional state was achieved. With it TS indicators after rehabilitation course were from 0 to 10, and VC – 1<VC<1.5. This fact witnesses about optimal level of activity. Analogous results were achieved only in 18 students (52.94%) after course of commonly accepted methodic of therapeutic massage (difference between main and control groups – 37.96 %; difference is statistically significant, $p<0.01$); in case of Chinese elements' application – in 23 students – 71.87% (difference between indicators – 19.03%; difference is statistically significant, $p<0.05$), ajurvedic – 25 (73.53%) (difference of indicators – 17.37%; difference is statistically significant, $p<0.05$), Tibetan – 24 (72.73%) (difference between indicators – 18.17%; difference is statistically significant, $p<0.05$), Egyptian – 21 (72.41%) (difference between indicators – 18.49%; difference is statistically significant, $p<0.05$).

For integrative assessment of students' backbone functional state we found expressiveness of vertebral pain syndrome (pain index) by criteria of Institute of rheumatology RAMS; we used visual analogous scale (VAS) of pain; kinesthesiologic assessment of muscular syndrome (index of muscular syndrome) by Salkhanov-Khabirov's scale [7] (see table 3).

Table 3. Dynamic of integral indicators of backbone functional state (M±m)

Rehabilitation groups	**Period of testing**	**Pain index (points)**	**Vas test (points)**	**Muscle syndrome index (points)**
Rehabilitation with integrative massage technology (n=33)	Before rehabilitation	1.24±0.05	3.01±0.05	9.56 ±0.08
	After rehabilitation	0.15±0.04	0.25±0.05	1.25±0.04
	p	<0.05	<0.05	<0.05
Treatment with commonly accepted techniques of therapeutic massage (n=34)	Before rehabilitation	1.23±0.05	3.05±0.11	9.28±0.17
	After rehabilitation	0.59±0.05	1.23±0.08	2.78±0.1
	p	<0.05	<0.05	<0.05
Improved massage methodic with elements of traditional Chinese massage (n=32)	Before rehabilitation	1.22±0.05	3.02±0.56	9.45±0.15
	After rehabilitation	0.34±0.04	0.59±0.06	1.52±0.06
	p	<0.05	<0.05	<0.05
Improved massage methodic with elements of traditional ajurvedic massage (n=34)	Before rehabilitation	1.27±0.04	3.04±0.06	9,35±0,16
	After rehabilitation	0.31±0.04	0.62±0.07	1.56±0.08
	p	<0.05	<0.05	<0.05
Improved massage methodic with elements of traditional Tibetan massage (n=33)	Before rehabilitation	1.25±0.05	3.04±0.06	9.35±0.16
	After rehabilitation	0.27±0.04	0.61±0.05	1.53±0.04
	p	<0.05	<0.05	<0.05
Improved massage methodic with elements of traditional Egyptian massage (n=29)		1.15±0.06	2.75±0.05	9.46±0.12
		0.26±0.05	0.51±0.06	1.57±0.09
	p	<0.05	<0.05	<0.05

Comparative analysis of positive influence of backbone functional state indicators before and after rehabilitation by therapeutic massage means of different methodic permitted for us to supplement the data about effectiveness of rehabilitation by integrative massage technology. Changes of pain index were as follows:

- Integrative massage technology – 87.9±2.15%;
- Commonly accepted methodic – 52.01±2.36%;
- Application of Chinese massage elements – 72.13±2.14%;
- Application of ajurvedic massage elements – 75.59±2.26%;
- Application of Tibetan massage elements – 78.4±2.54%;
- Application of Egyptian massages elements – 77.39±2.46%.

Indicator of VAS test improved after application of:

- Integrative massage technology – 12.5 times;
- Commonly accepted methodic – 3 times;
- With application of oriental massage systems (Chinese, ajurvedic, Tibetan, Egyptian) – 5 times.

With rehabilitation by integrative massage technology index of muscular syndrome reduced nine times. With application of commonly accepted methodic it reduced three times. The same index reduced six times with application of oriental techniques' elements (Chinese, ajurvedic, Tibetan, Egyptian).

In main group of the tested indicators of backbone functional state improved (with application of integrative massage technology) as well as percentage. For example, in 29 (87.88%) main group students we observed stability of received positive results (absence of pain syndrome; total index of muscular syndrome by Salkhanov – Khaboriv – from one to seven points; absence of functional blocks, which cause discomfort and pain in separate backbone sections or limitation of mobility in certain vertebral motor segments). In control groups the same positive effect was found only in 19 (55.88%) students. It is by 32% less than results of main group (difference is statistically significant, $p<0.01$). With application of massage methodic such effect was observed in the following:

- Application of Chinese massages elements – in 21 students (65.63%) (difference of indicators – 22.25%; difference is statistically significant, $p<0.05$).
- Application of ajurvedic massage elements – 23 (67.64%), (difference between indicators –20.24%; difference is statistically significant, $p<0.05$);
- Application of Tibetan massages elements – 23 (69.7%) (difference between indicators –18.18%; difference is statistically significant, $p<0.05$);
- Application of Egyptian massages elements – 20 (68.96%) (difference between indicators –17.92%; difference is statistically significant, $p<0.05$).

Thus, analysis of dynamic of backbone functional state indicators witnesses that in the course of rehabilitation be integrative massage technology all changes were the most substantial. In general analysis of the research's results permits for us to say that rehabilitation with the help of integrative massage technology more effectively influences on general psycho-emotional state of young people and facilitates improvement of backbone functional state.

Discussion

Various massage technologies play important role in physical rehabilitation of young people [1; 5; 6; 8]. Rehabilitation specialists of western and oriental countries achieved noticeable success in creation of new rehabilitation massage methodic, working out of new systemic approaches to rehabilitation [7; 17; 20; 23]. Alongside with it there is an opinion of some rehabilitation specialists that some techniques of diagnosis and treatment in manual therapy, massage osteopathy, applied kinesiology do not principally differ. All specialists "stretch, press, shift, rotate, push and crunch". List of techniques is constantly replenished. With all originality of names, analysis of rehabilitation specialist's movements, when he fulfills massage technique, points at fulfillment of actual (real) stretching, pressing, swinging, shifting and vibration. All they are natural physiological irritators of extra receptors and proprioreceptors of different localization [3]. Though, in literature rehabilitation methods, which combine prophylaxis and therapeutic effect of massage techniques of western and oriental systems, are not sufficiently elucidated. Realization of different techniques from different systems is dictated not by their sequence but peculiarities of pathologic process or rehabilitant's functional state.

The fulfilled research witnesses that worked out by us integrative massage technology permits to use positive elements of different systems in one rehabilitation session and is effective. In our opinion application of this technology will facilitate prophylaxis of vertebral diseases and increase of rehabilitation effectiveness.

Conclusions

Thus, we can make conclusion that worked out by us integrative massage methodic facilitates optimization and increase of rehabilitation effectiveness and has practical and theoretical significance.

Acknowledgements

The research has been fulfilled in compliance with “Combined plan of SRW in sphere of physical culture and sports for 2011– 2016” Of Ministry of Ukraine on family, youth and sports, by topic 4.4”Perfection of organizational and methodic principles of physical rehabilitation programming with dysfunctional disorders in different systems of human organism”, state registration number 01111U0011737.

Conflict of interests

The author declares that there is no conflict of interests.

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Cite this article as: Kotelevskiy V.I. Integrative technology of massage manipulations in physical rehabilitation of students with backbone pathology. *Pedagogics, psychology, medical-biological problems of physical training and sports*, 2016;3:31–40. doi:10.15561/18189172.2016.0305

The electronic version of this article is the complete one and can be found online at: http://www.sportpedagogy.org.ua/html/arhive-e.html

Received: 15.06.2016
Accepted: 20.06.2016; Published: 28.06.2016