

COMPARISON OF SUBJECTIVELY PERCEIVED PRO-HEALTH EFFECTS OF PRACTICING VARIOUS FORMS OF BODY & MIND TRAINING IN WOMEN

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Abstract Background: Body & mind trainings are forms of aerobics, the aim of which, apart from improving physical fitness, is to additionally provide mental relaxation. The aim of this study was a comparison of physical and mental pro-health effects from practicing Hatha yoga, Pilates and bodyART.

Material and methods: Our own self-assessment questionnaire was used assess the impact of selected forms of body & mind training on the physical and mental fitness of people regularly practicing the forms. A group of 81 women practicing Hatha yoga, Pilates or bodyART for a minimum of 2 workouts per week were qualified. Additional inclusion criteria involved at least a 2-month training period and not practicing the other sport disciplines in study period.

Results: After regular body & mind training, significant beneficial changes involving primarily the reduction of joint pain and increased flexibility were subjectively noticed by the participants. Changes included a significant reduction of back pain for Hatha yoga and Pilates and reduction of knee pain and improvement of the sense of balance for bodyART.

Conclusions: Practicing body & mind forms has a beneficial impact on the perception of psychophysical health, regardless of the type of training, while the bodyART form generally showed the greatest number of effects.

Key words pro-health training, body & mind, Hatha yoga, Pilates, bodyART

Introduction

Body & mind trainings are modern forms of aerobic workouts combining physical exercises with mental training, through concentration of attention on breathing and body work. Their goals, apart from improvements in physical fitness, are to provide psychical relaxation and to restore body and mind balance. Body & mind forms can include all types of collective aerobic trainings that are focused on unity of the body and mind, learning correct breathing, and forming a body consciousness. Many types of training meet these criteria, and with the freedom to create new

workout plans with original specific names, their number are increasing. The most popular and recognizable forms of this type are Hatha yoga, Pilates and bodyART (Podciechowska, Karpińska, Sikorska 2015; Figurska, 2018).

Hatha yoga

One of the oldest body & mind forms practiced nowadays is Hatha yoga. The word “hatha” means strong effort and describes the combination of physical exercise, breathing and relaxation techniques to improve general fitness. Yoga constitutes a system of holistic hygienic, educational and therapy in which the essential element is a specific philosophy, while Hatha yoga is focused on body training, without the requirement of any spiritual or metaphysical principle (Podciechowska et al., 2015; Palica, Zwierzchowska, 2012; Grabara, 2009; Sorosky, Stilp, Akuthota, 2008).

The practice of Hatha yoga consists of special positions (*asanas*) which in a controlled way stretch and strengthen the muscles and stimulate a sense of balance (Figure 1a, 1b). *Asanas* include lying, sitting, standing, as well as inverted positions such as headstands. Each *asana* position is held for long time before moving to the next *asana*. The word “*asana*” literally means “comfortable position”, thus the main goal of practitioners is to stay effortlessly and comfortably in each position. To increase the effectiveness, the *asanas* are complemented with special breathing exercises called *pranayamas*. These techniques are not intended to increase the ventilation, but rather to set correct proportions between the phases of breathing (Podciechowska et al., 2015; Palica, Zwierzchowska, 2012; Grabara, 2009; Sorosky et al., 2008).

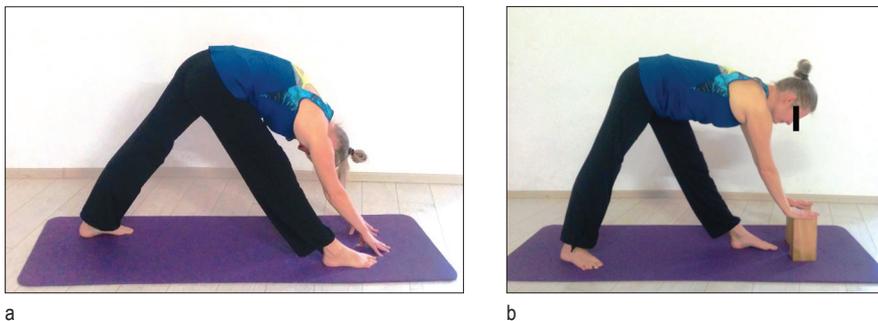


Figure 1. Parsvottanasana – pyramid position: unsupported (a) and with supports (b)

The regular practice of Hatha yoga leads to increase in the range of motion in the joints and helps form a correct body posture and body consciousness, and due to the positive effect on the psyche it improves concentration, tenacity and patience. Particular rotational positions positively improve the work of the digestive system. Application of the breathing techniques assists in tissues oxygenation, increases the metabolism and facilitates toxin removal (Podciechowska et al., 2015; Grabara, 2009; Grabara, Szopa, 2011).

With regard to its pro-health character and the possibility of individual training adjustment, Hatha yoga can be practiced by persons of all ages and fitness levels. Its universality is also emphasized by the fact that it doesn't require any special equipment. Exercises are performed barefooted in loose clothes on non-slip gym mats. There

are not many contra-indications for Hatha yoga and they are non-specific, thus in the case of their occurrence, it is usually possible to avoid a selected group of asanas without having to give up all training (Grabara, 2009).

Pilates

The exercise system was created by Joseph Pilates in the early 20th century and was inspired by Yoga, martial arts and other ancient methods of exercise. During the First World War it was used with hospital patients, and later was adapted for dancers following injuries, and to support their training, and for a long time it was a method reserved exclusively for this group (Sorosky et al., 2008; Kloubec, 2010; Mazur, Marczewski, 2011).

Pilates training is based on simple exercises with a small load matched individually and regularly increased. Its level of exercise is raised not by multiplying the number of exercises, as in the case of strength training, but by extending the time of isometric tension of the muscles and by improving the quality of movement, which leads to strengthening without excessive mass gain. Exercises are performed on mats, without additional load, and the most often used positions in this form of training are various types of sitting and lying positions (Figure 2 and 3). Exercises can be also performed with additional accessories such as balls, elastic bands and sticks. Regular training leads to an improvement in dynamic postural control and balance, which is achieved by gradually introducing more and more complex multiplanar movements of the trunk and limbs. Pilates also positively influences the body posture, develops the movement potential and body endurance and reduces stress levels, thus affecting an overall improvement in health (Podciechowska et al., 2015; Sorosky et al., 2008; Kloubec, 2010; Mazur, Marczewski, 2011).



Figure 2. Pilates – Teaser



Figure 3. Pilates – Swimming

BodyART

BodyART is an aerobic training form created and developed by Robert Steinbacher in the 1990s. Its characteristic feature is the oriental approach to training, treating a person as an indivisible unit of the body and soul. It was created on the basis of such methods as yoga, Tai Chi, and Qi Gong. It contains elements of Chinese medicine and the Japanese system DO IN. It is also based on the Yin and Yang theory and the Chinese theory of 5 elements. Importantly, despite the inspiration from so many sources, bodyART is completely devoid of any religious or spiritual background (Podciechowska et al., 2015; Polska szkoła bodyART, www.bodyartschool.pl; BODYART International, <https://international.bodyart-training.com/info/history>; Burzawa, 2017).

BodyART exercises are performed without any additional accessories using just the weight of the body. The pace is calm and the movements smooth and harmonized with the breath. At the entry level of training, practitioners learn to maintain stable correct positions, and after achieving this skill, more and more difficult elements are introduced. Ultimately, the main content of the training is a combination of multi-articular movements in all planes with a large balance component, involving simultaneously many muscle groups (Figure 4) (BODYART International, <https://international.bodyart-training.com/info/history>; Burzawa, 2017).



Figure 4. Example of bodyART exercise

BodyART seeks to improve and maintain health with a systematic practice at least twice a week. Regular training, teaching precision and focusing on exercise techniques, forms and correct movement patterns. It improves stabilization of the body posture and acts preventively in diseases of the locomotor system. The use of relaxation exercises reduces the symptoms of fatigue and alleviates the effects of physical and mental stress (Podciechowska et al., 2015; Polska szkoła bodyART, www.bodyartschool.pl; BODYART International, <https://international.bodyart-training.com/info/history>; Burzawa, 2017).

BodyART is a safe form of training, suitable for all people regardless of gender, level of physical fitness and age. By focusing on a selected aspect – functional, therapeutic, physical or mental – the course can be differentiated and adapted to the individual needs of the practitioner. In comparison to other body & mind forms, bodyART is more dynamic, and can be an interesting alternative e.g. for people for whom Pilates or Hatha yoga are too static. For particularly demanding people looking for dynamic exercises with a greater load, trainers and people actively practicing sports, two more advanced types of training were designed – BAX (bodyART Extreme) and deepWORK (Polska szkoła bodyART, www.bodyartschool.pl BODYART International, <https://international.bodyart-training.com/info/history>; Burzawa, 2017; Tymoszewicz-Bednarz, Rodak-Dębowska, 2017).

With these mind & body practices in mind, the aim of this study was to show subjective assessment of the positive impacts of health-promoting training on physical and mental health, and to show differences in the observed effects achieved by the various forms of training – Hatha yoga, Pilates and bodyART.

Material and methods

Research tools

Our own self-assessment questionnaire was used to assess the impact of selected forms of body & mind training on the physical and mental fitness of people regularly practicing the forms. The questionnaire consisted mainly of closed type questions, in which the subjects marked the presence or absence of specific symptoms – in both the period before the start of training and after practicing the particular health-promoting form for a minimum of 2 months. The remaining questions concerned health changes observed by the subjects which occurred during their training. Additionally, on a modified 11-point Likert scale, the subjects assessed their level of satisfaction with the form, as well as their current efficiency and that prior to commencing the form. In these questions, a value of 0 meant a total lack of satisfaction with the form or the worst possible efficiency, a value of 5 meant an indifferent value, and 10 meant complete satisfaction with the form or no objections to the fitness level.

Study group characteristics

Questionnaires were distributed in fitness clubs and training studios in Krakow and the surrounding area to willing people. Finally, 81 women were qualified for the study after meeting the inclusion criteria, which included:

- female gender,
- regular participation in Hatha yoga, Pilates or bodyART training with 2 or more workouts per week lasting 60 or 90 minutes (60 minutes for Pilates and bodyART, 90 minutes for hatha yoga),
- minimum 2-month training period, measured from the start of regular training to the day of the assessment,
- no parallel sport discipline practiced during the examined period.

The subjects ($n = 81$) were divided into three groups matching the form of training – 30 (37%) in Hatha yoga, 27 (33%) in Pilates and 24 (30%) in bodyART.

The average age of the subjects in all groups was 41.4 years. In those practicing hatha yoga, the mean age of 36.6 years was significantly lower than the other groups. The mean value of the body mass index (BMI) across all subjects was 22.7. Similarly, in women practicing Hatha yoga, the mean BMI was significantly lower than in the other groups (Table 1).

Table 1. Descriptive statistics of age and BMI for the whole study group and in the particular training groups

Parameter	All				Hatha joga		Pilates		bodyART		p
	mean	SD	min	max	mean	SD	mean	SD	mean	SD	
Age [years]	41.35	11.81	17	67	36.60	12.11	45.74	11.36	42.33	10.07	0.0109
BMI [kg/m ²]	22.70	3.32	16.65	32.39	21.12	2.48	23.52	3.45	23.79	3.44	0.0032

SD – standard deviation, p – level of significance α .

For the whole study group, the length of training period was 32.7 months. The average number of trainings per one week was 2.63 (Table 2).

Table 2. Descriptive statistics of the training period and the number of training sessions for the whole study group and in particular training groups

Parameter	All				Hatha joga		Pilates		bodyART		p
	mean	SD	min	max	mean	SD	mean	SD	mean	SD	
Training duration [months]	32.68	38.35	2	200	23.30	22.08	33.74	36.94	42.21	52.21	0.1639
Number of trainings per week	2.63	1.03	2	6	2.80	1.19	2.33	0.68	2.75	1.11	0.1855

SD – standard deviation, p – level of significance α .

Statistical analysis

Statistical analyses were carried out using Statistica v13.1 (StatSoft Inc.). In order to examine the diversity of variance in the three independent groups and to determine which differences between them are statistically significant, univariate analysis of variance (ANOVA) and post-hoc Tukey tests were used. The relationships between independent and dependent groups for qualitative data was evaluated by Chi Square Pearson and McNamara tests. The T student's test for dependent groups was used to compare the average scores obtained before and after the training period. Results were considered significant at $p < 0.05$.

Results

Participants of the study assessed their satisfaction with the practiced training on a modified 11-point Likert scale. Particular values meant: 0 = "I'm not happy at all, this is the worst workout I can imagine", 5 = "I'm moderately happy, I think this training is mediocre", 10 = "I'm very happy, this is the best workout I can imagine". The lowest result indicated was 7. In the groups practicing Hatha Yoga and Pilates, the results were similar (9.53 ± 0.82 and 9.37 ± 0.97 respectively). A slightly higher mean value of satisfaction and lower standard deviation (9.83 ± 0.48) was assessed by participants of bodyART, but the difference was not statistically significant ($p = 0.1167$). For the whole study group, the average satisfaction value was 9.57 ± 0.81 .

The next parameter assessed was the subjectively perceived change in fitness which occurred as a result of practicing the chosen form. Subjects determined their physical and mental fitness on a modified Likert scale, assessing their health separately in the time before the start of regular training, and on the day of the survey. The particular values on the scale meant: 0 = "the worst efficiency that I can imagine, completely unsatisfying

me”; 5 = “average efficiency, requiring some adjustments, but relatively satisfying me”, 10 = “very good efficiency, completely satisfying me and not requiring any improvement”. The results are shown in Figure 5.

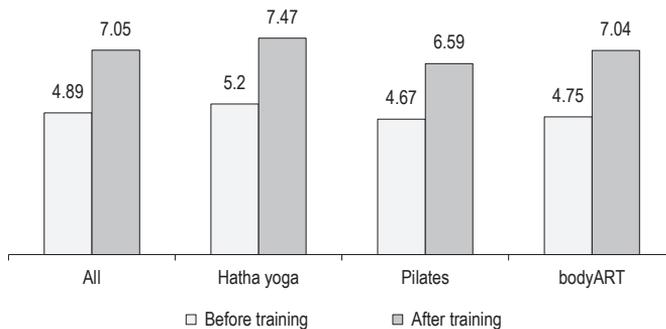


Figure 5. Comparison of general fitness self-assessment results performed by participants in whole group and particular subgroups before beginning of trainings and on the day of assessment (pts)

The results obtained before the training period were subtracted from those obtained post-workout, yielding the value of the change in fitness which occurred as a result of practicing body & mind forms. The changes in fitness for the entire study group and obtained in all training groups were statistically significant ($p = 0.0000$). For the entire study group, the average change value was 2.16 ± 1.41 . The biggest change was obtained for bodyART (2.29 ± 1.27) and Hatha yoga (2.27 ± 1.28), then Pilates (1.93 ± 1.66). Although one of the Pilates practitioners indicated that after the training period her performance deteriorated by 1 degree on the scale, the obtained results did not differ significantly between all groups ($p = 0.5753$).

Over 90% of participants in each type of training indicated that they noticed an improvement in their health that resulting from the training (Hatha yoga – 96.7%, Pilates – 92.6%, bodyART – 95.8%). Some subjects, most of whom belonged to the Pilates group (7%), reported that they did not see any change. None of the surveyed women noticed any negative impact of training on their fitness. Differences in these results were not statistically significant ($p = 0.7612$).

Subsequently, the participants were asked to indicate specific changes regarding their functioning in everyday life which could be attributed to the body & mind trainings. The most frequently marked answers in all groups were reduction of joint pain, improvement of condition and flexibility. The least frequent indicated answer was a decrease in body weight. Only for two changes the dependence with the type of training practiced was stated – an improvement of self-esteem and mental state. In both cases, the ladies who attended bodyART classes most often indicated this answer (Table 3).

Table 3. Percentage comparison of subjectively noticed changes in various health aspects after training period in particular training groups

Change	Hatha yoga [%]	Pilates [%]	bodyART [%]	p
None	0.00	3.70	0.00	0.3633
Decreased back pain	60.00	70.37	66.67	0.7052
Improved flexibility	83.33	66.67	79.17	0.3120
Improved balance	43.33	55.56	62.50	0.3560
Weight loss	20.00	14.81	16.67	0.8710
Improved endurance	60.00	48.15	70.83	0.2568
Self-esteem improvement	33.33	37.04	66.67	0.0318
Mental improvement	53.33	37.04	75.00	0.0247
Others	0.0	7.41	4.17	0.2133

In the next questions, participants pointed to the ailments they felt before the start of regular training and on the day of the survey. Statistically significant beneficial changes in physical and mental condition were observed in all groups. For the entire study group, they assessed the reduction of back, hip, knee and shoulder joint pain, improvement in the sense of balance, increase in endurance and vital energy, and improvement of the mental state. Also, the number of people who did not report any health problems increased significantly after the training. There were also significant changes specific to each form of training ($p < 0.05$). Both in the group practicing Hatha yoga and Pilates, significant changes concerned in the reduction of back pain and increased vital energy. The number of people who consider themselves completely healthy increased considerably after training in Hatha yoga. The most statistically significant changes were observed under the influence of bodyART training. In addition to the increase in vital energy and the number of people not reporting any health symptoms, this type of training also had a significant impact on the sense of balance and reduction of pain in the knee joints (Table 4)

Table 4. Comparison of health effects subjectively noticed by all participants and in subgroups practicing particular body & mind forms

Complaints	Total		Hatha Yoga		Pilates		bodyART	
	change [%]	p						
1	2	3	4	5	6	7	8	9
Spine pain	-27	0.0000	-33	0.0094	-22	0.0412	-25	0.0771
Hip pain	-17	0.0022	-13	0.1336	-22	0.0771	-17	0.2207
Knee pain	-15	0.0095	-10	0.3711	-7	0.6171	-29	0.0455
Feet Pain	-6	0.1824	-3	1.0000	-4	1.0000	-13	0.2482
Shoulder pain	-14	0.0098	-10	0.3711	-11	0.2482	-21	0.1306
Elbow pain	-1	1.0000	0	-	0	-	-4	1.0000
Wrist pain	-2	0.7237	-3	1.0000	0	-	-4	1.0000
Gait problems	-2	0.4795	-3	1.0000	-4	1.0000	0	-
Problems with balance	-15	0.0033	-10	0.2482	-11	0.6171	-29	0.0455
Limitation of joints range of motion	-5	0.1336	-3	1.0000	-4	1.0000	0	0.4795
Stress urinary incontinence	-1	1.0000	0	-	-4	0.4795	-4	1.0000
Excessive body weight	-5	0.3428	-7	0.4795	-7	0.6171	-4	0.6171

	1	2	3	4	5	6	7	8	9
Fast fatigability		-15	0.0095	-17	0.1306	-11	0.4497	-17	0.1336
Sleep problems		-6	0.1824	-7	0.6171	-7	0.6171	-4	1.0000
Lack of vital energy, feeling of permanent fatigue		-38	0.0000	-37	0.0000	-30	0.0269	-50	0.0015
Psychological problems		-14	0.0056	-13	0.1336	-15	0.1336	-13	0.3711
Others (migraines, gynecological problems)		-4	0.3711	-3	1.0000	-11	0.6171	-4	1.0000
No complaints		27	0.0000	37	0.0026	15	0.2207	29	0.0233

Discussion

The main argument for taking up the subject of this study was the small number of studies carried out so far on the health-promoting effects of practicing body & mind type trainings. The authors were also unable to find any scientific reports on the health impact of bodyART training. Only a small amount of information about this method was available, mainly in online sources, despite its popularity in fitness centres.

Among the functional changes, the reduction of joint pain and improvement of flexibility appeared to be the most frequent in all groups – described by the respondents as a feeling of easier movement in the joints, which were particularly marked by the participants of Hatha yoga. The beneficial effect of Hatha yoga on the mobility of the spine in healthy people has been demonstrated by D. Palica, A. Zwierzchowska and I. Ślężyńska (2010), assessing a group of 43 female students who practiced selected asanas as part of physical education classes for 15 weeks compared to a control group of swimming training. There was a significant improvement in flexibility in all planes in those practicing Hatha yoga, and a lack of improvement among the swimmers. What is worth noting in the initial measurements is that the Hatha yoga group showed poorer mobility than the control group. That study has also shown an improvement in posture in women practicing Hatha yoga, in the form of a slight decrease of asymmetry in the transverse plane.

Subsequently, differences in symptoms occurring before and after the period of practicing a selected pro-health form were analyzed. Over 90% of respondents in all training groups indicated that they perceived a positive effect from the practiced activity on their health, while none noticed any deterioration. These results are consistent with results of studies carried out by J. Szopa, M. Grabara and J. Górna (2009) among people aged 47-72 who practiced Hatha yoga – 100% of participants of that study felt the positive impact of training on overall fitness and mental and physical condition. Additional changes resulting from Hatha yoga were related to the reduction of perceived stress, improvements in concentration and creativity.

Similar results were obtained by W. Łubkowska (2015), who studied the effects of the participation of 60 women aged over 50 in aqua fitness classes, using a questionnaire survey. This training was relatively similar to the body & mind form because it was focused on functional exercises, forming central stability, coordination, balance and flexibility, and contained therapeutic and relaxing elements, while the respondents did not practice any other sports disciplines at the same time. In this report, an increase in overall fitness was recorded for 63% of participants, while 75% of them reported improvement in well-being and the feeling of being healthier. A comparison of these values with the results of our study allows us to suppose that the body & mind forms prevailed in therapeutic effect over those performed in water.

In our study, a significant improvement in mental state was noted for the entire study group, and a significant increase of perceived vital energy with a simultaneous decrease in the sense of chronic fatigue. The results of Pilates training were also demonstrated by M. Lipko-Kowalska (2017) in a questionnaire-based survey conducted on a group of 40 women regularly practicing this method. Mean age of the subjects was 48 years and the training period was 6 or 12 months. The respondents indicated that due to regular training they had more energy, were less stressed and more optimistic about life, and their self-esteem was higher. They also admitted that Pilates changed their lifestyle, improved their mental condition and positively influenced their social functioning. Importantly, the respondents noticed that the level of health increased with the extension of the training period, simultaneously strengthening the awareness of need for regularity to achieve the desired results. Similar results in a pilot study conducted among 30 women practicing Hatha yoga were noted by M. Sławek and R. Śleboda (2011). They stated that the level of life satisfaction, inner calm and acceptance of others rose with the extension of the training period. In addition, along with the reduction of physical and mental ailments, their sense of freedom, security and personal satisfaction increased.

The most frequently indicated benefits from the pro-health training were pain reductions in the spine and large peripheral joints. In our experiment, pain reduction in these areas was found on average in 66% of respondents. Significant changes observed in the entire study group concerned spine, hip, knee and shoulders. In particular training groups, the greatest impact of practiced activities was noted for spine joints. Significant reduction of pain in this region occurred as a result of the practice of both Hatha yoga and Pilates. Unlike, in the bodyART group, the significant difference was related to the reduction of pain in the knee joints.

The beneficial effect of 10 Pilates training sessions on pain and mobility of lumbar spine was confirmed by P. Karasiński, K. Pawłowska and J. Pawłowski (2017). They carried out research using the RMDQ and WHOQOL-BREF questionnaires and specific tests of mobility and stabilization of the trunk on a group of 30 women aged 50-65 with diagnosed degenerative disease of the lumbar spine. This training was shown to significantly reduce the pain (from 4.7 to 3.4 points in RMDQ), improving the mobility and stabilization of the lumbar spine. In addition, participants of the study assessed their quality of life higher after the training sessions. The influence of physical activity on joint pain was also examined by D. Milka, M. Jachacz-Łopata, A. Famuła, A. Brzęk and T.S. Gaździk (2011) who conducted a diagnostic survey among 118 women aged 25-60, regularly practicing aerobics in the period from 2 to 12 months. Practiced forms included whole-body training, strength training, Hatha yoga and Pilates. As a result, a reduction in spine pain in the lumbar and cervical segments was observed in over 75% of the subjects. In comparison to the values reported before starting the activity, the change was on average 3.75 points on the visual-analog scale. The values achieved in the study described above are higher than the results of our experiment, which may result from the fact that the research group consisted of people practicing different types of training, while the women included in our study practiced only one of the forms.

In our study, in the subjective feelings of the participants, the improvements in most health aspects were obtained through bodyART. In addition to the overlap of most of its effects with the results obtained in Hatha yoga and Pilates, bodyART also resulted in a significant improvement in self-perceived balance, psychological condition and self-esteem, and a significant reduction in pain of the knee joints. In the authors' opinion, the effect on the balance may result from the use of a large number of dynamic sequences in the various body positions, including equivalent positions. The reduction of knee joint pain may be affected by the performance of many exercises

strengthening the quadriceps muscle and the large number of stretching sequences of the hamstrings, which may positively affect the stability of the knee joint.

Our study has some significant limitations. First is the use of a non-standardized tool which impedes comparisons with other studies. The next limitation is the relatively small number of subjects, and last but not least, the results concern only the subjective assessment of the body & mind forms. These results could be confirmed by objective functional assessments and also compared with a control group (or groups) that represents physical activity other than body & mind training.

Despite these limitations, the results of the experiment did allow us to carefully assume that bodyART is a training that treats the person in a more holistic way than the other described body & mind forms. In the subjective opinion of participants, all the forms made significant improvements, with one form providing slightly greater effects on functioning in everyday life and improvements in health.

Conclusions

1. Regular practicing of body & mind forms can have a positive effect on subjectively perceived mental and physical health, regardless of the type of training chosen.
2. Under the influence of regular body & mind training, there are a number of positive changes in the subjectively perceived overall fitness of practitioners, the highest number of which are observed in those who practiced bodyART.

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