



Original Article

Influence of structural integration and fascial fitness on body image and the perception of back pain

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Abstract. [Purpose] The aim of this study was to examine the influence of Structural Integration and Fascial Fitness, a new form of physical exercise, on body image and the perception of back pain. [Subjects and Methods] In total, 33 participants with non-specific back pain were split into two groups and performed three sessions of Structural Integration or Fascial Fitness within a 3-week period. Before and after the interventions, perception of back pain and body image were evaluated using standardized questionnaires. [Results] Structural Integration significantly decreased non-specified back pain and improved both “negative body image” and “vital body dynamics”. Fascial Fitness led to a significant improvement on the “negative body image” subscale. Benefits of Structural Integration did not significantly vary in magnitude from those for fascial fitness. [Conclusion] Both Structural Integration and Fascial Fitness can lead to a more positive body image after only three sessions. Moreover, the therapeutic technique of Structural Integration can reduce back pain.

Key words: Back pain, Rolfing, Exercise

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INTRODUCTION

Almost everyone experiences back pain during the course of their life^{1, 2)}. The majority of back pain cases are considered non-specific³⁾. Due to this high prevalence, not only therapeutic but also preventive measures are of great scientific interest. A multifaceted set of therapies is being developed and applied to treat back pain. This includes pharmacotherapy, physiotherapy, and psychological therapy, as well as interventional and complementary methods⁴⁾.

Structural Integration (SI) belongs to the group of complementary manual therapies⁵⁾. It is a type of manual therapy, but at the same time also a holistic somatic education method. Its main aim is to improve the biomechanical function of the musculoskeletal system⁵⁾. With fascial manipulation, the therapist aims to improve the structure of the body and the efficiency of its movements⁶⁾. The main focus is not only to treat specific symptoms, but to incorporate the entire body network⁷⁾. A change in body movement patterns, and reeducation of muscular habits, leads to improvements in the physio-psychological condition of the entire human organism⁸⁾.

In addition, based on the latest findings in the field of fascial research^{9–12)} and the new knowledge that fascia is vital for an organism's growth in both healthy and disease states¹³⁾, a new form of physical exercise called Fascial Fitness (FF) has evolved. According to various authors, this type of physical exercise leads to an “elastic”, durable and resistant fascial network within the human body¹⁴⁾. The aim of FF is to enhance collagen regeneration with the help of a specific type of exercise¹⁵⁾.

To the best of our knowledge, the following study represents the first scientific investigation of the effects of FF exercises and SI on body image and the perception of back pain among people with non-specific back pain.

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SUBJECTS AND METHODS

Participants were recruited by flyers distributed throughout our university's sports complex, and through personal contact with people suffering from non-specific back pain. A total of 36 persons (19 females and 17 males; mean age: 37.9 ± 9.2 years) provided written informed consent to participate in the study. To be eligible for the study, participants had to suffer from non-specific back pain (measured on a visual analogue scale [VAS]) at the outset of the investigation. During the intervention period, participants were advised, and agreed, to abstain from any additional medical or therapeutic treatments. The participants were randomly assigned to one of two groups. Eighteen participants were assigned to the SI group and 18 were assigned to the FF group. During the study period, two participants in the SI group, and one in the FF group, dropped out due to illness during an intervention session. The study was carried out in accordance with the ethical standards laid down in the Declaration of Helsinki, and was approved by the Institutional Review Board of the Department of Sport Science, University of Innsbruck.

The SI sessions were conducted by a SI practitioner, once a week for 3 weeks. Each session lasted 60 minutes. SI included working with predefined anatomical structures and myofascial chains, such as the superficial front line, the superficial back line and the lateral line as described by Myers⁷. The practitioner mainly worked on fascia and connective tissue through hand pressure, with the aim of releasing adhesions and restoring sliding structure^{6, 16}. The therapy sessions were carried out in a one-to-one setting, with the participant mainly assuming a lying position (on the back or on the side). Sitting and standing positions were required only at the end of a session.

The FF sessions, each lasting for 60 minutes, were conducted once a week and were guided by a trained FF coach. Due to organizational reasons (i.e., time schedule of the participants and availability of the gym), the 18 participants were divided into two groups ($n=12$ and $n=6$); however, both groups performed the same exercises. The aim of the FF program was to apply specific stretching exercises and springy movements to stimulate the fascial fibroblasts and allow them engender a more durable, elastic and properly lubricated fascial architecture¹⁷.

The FF program was based on the DVD "Fascial Fitness" by Dennenmoser et al.¹⁵, and was conducted according to the following principles:

- Preparatory counter movements (preparatory stretches prior to the actual movements);
- Springy movements, executed in a smooth and elastic manner that engages the long myofascial chains without straining the fascia;
- Participants should not be pushed to the limit; and
- Exercises should be used to improve body sensitivity and sensory perception.

Before and after the 3-week intervention period, perception of back pain, as well as body image (FBK-20) was evaluated using standardized questionnaires (see below for a detailed description).

VASs were used to determine each participant's perception of back pain¹⁸. VASs are widely used in medical procedures to determine a person's perception of pain and general well-being. Each VAS consists of a straight line, 10 cm in length, with two polar extremes as anchor points, such as "no pain" and "strongest pain imaginable". The participants denote their personal perception of back pain at the time of examination by placing a cross in the appropriate spot on the one-dimensional scale. The VAS is a useful instrument for determining the degree of, and changes in, pain perception, or general perception of well-being¹⁹.

The questionnaire to determine body image contained 20 items, with a rating scale ranging from "does not apply" to "definitely applies". In a very economic fashion, the questionnaire measured two different dimensions of body image. On the "negative body image" scale, participants evaluated their own physical appearance and how comfortable they felt inside their own bodies. The "vital body dynamics" scale deals with movement- and energy-related aspects of body image. It is used to describe the degree to which strength, fitness and general health are experienced²⁰.

The statistical evaluation was carried out using the SPSS software package (ver. 18.0; IBM Corp.). The Kolmogorov-Smirnov Test was used to test for a normal distribution. A two-way analysis of variance (main effect: time, interaction effect: group \times time) and paired t-tests were applied to test for differences between and within groups. The results are displayed as means \pm standard deviation (SD). The level of significance was set at $p < 0.05$.

RESULTS

At the outset of the study, all participants were suffering from latent pain in the back or spine. In total, 27 participants (81.8%) were suffering from acute back pain at the time of the first examination; six participants (18.2%) did not have acute pain. Pain was located in the lumbar spine ($n=15$), cervical spine ($n=14$), and thoracic spine ($n=4$). Six participants (three in the FF and three in the SI group) had already received a diagnosis of prolapse; one of them was treated surgically. The majority of the participants were regularly active, except for two who did not practice any sports. At the time of the study, 10 participants (5 each in the FF and SI groups) performed additional back exercise routines, including relaxation techniques such as Yoga and Feldenkrais, exercises for strength, mobilization and stabilization, and also Pilates and gymnastics. Seventeen participants (51%) aimed to increase their flexibility by performing stretching and mobilizing exercises.

Table 1. Changes in negative body image and vital dynamics scores in the SI and FF groups: pre- versus post-intervention

	SI group		FF group		ANOVA	
	Pre	Post	Pre	Post	Interaction (Group × Time)	Main effect (Time)
Negative body image	1.67 ± 0.59	1.45 ± 0.42*	2.25 ± 0.71	1.93 ± 0.83*	0.501	0.002
Vital body dynamic	3.63 ± 0.77	3.94 ± 0.52*	3.29 ± 0.72	3.40 ± 0.69	0.192	0.009

*Significant within group difference from pre- to post-intervention ($p < 0.05$, Student's t-test)

The level of back pain significantly decreased in the SI group (from 2.9 ± 1.6 to 1.8 ± 1.4 , $p = 0.011$), while in the FF group a trend towards an improvement in back pain was found (from 2.5 ± 1.9 to 1.6 ± 1.5 , $p = 0.098$). ANOVA revealed a significant effect of time (0.005) but no time × group interaction effect ($p = 0.832$).

Table 1 shows the outcomes of the body image questionnaire. Negative body image improved in both groups (SI and FF) after the intervention period (ANOVA: main effect of time, $p = 0.002$; paired sample t-tests: $p = 0.023$ and $p = 0.029$ for the SI and FF group, respectively) with no between group differences (ANOVA: time × group interaction, $p = 0.501$). Vital body dynamics improved only in the SI group (paired sample t-test, $p = 0.023$; ANOVA: main effect of time, $p = 0.009$) with no between group differences (ANOVA: time × group interaction, $p = 0.192$).

DISCUSSION

The main result of this study is that only SI led to a significant improvement in back pain perception. However, both SI and FF improved body image, to approximately the same extent.

Furthermore, SI led to a significant improvement in back pain perception after only three sessions, which took place within 3 weeks. Similar outcomes were described in the literature after 10 sessions. James et al. concluded that 10 SI sessions can significantly reduce pain and increase range of movement in the neck in patients suffering from cervical spine pain²¹). Additionally, Smith et al. showed that proper alignment of the thorax, lumbar spine and hips, which can be achieved through 10 SI sessions, was associated with an improvement in back pain²²). SI offers a holistic approach to the musculoskeletal system by dividing it into myofascial chains and fascial lines⁷). According to this model, tension can be balanced and reduced holistically via the fascial network of the body; this can be used to reduce tension in the lumbar spine, for example. The fact that the fascial network contains sensory receptors gives rise to new speculations. It has been suggested that areas of the back that are stimulated via fascial manipulation tend to perform proprioceptive functions (body perception) rather than nociceptive functions (pain perception)²³). These mechanisms could potentially explain the positive effect of SI on back pain.

Compared to SI only, FF training showed a trend towards an association with reduced back pain. The non-significance of this result could be explained by the relative brevity of the intervention period. In order to experience a perceptible change within the body, Müller and Schleip suggest a minimum length of FF intervention of 6 months¹⁷). This amount of time is considered necessary to allow collagen fibers to regenerate, which renders the fascial network of the body flexible and strong¹⁷). As FF is a relatively new method, further studies incorporating longer training periods are needed to investigate whether FF is able to reduce back pain and improve physical wellbeing. The finding that the thoracolumbar fascia might, at least in some cases, be a trigger for back pain²⁴) suggests that, through FF, back pain might be reduced.

With respect to body image, after only three sessions both FF and SI improved scores on the “negative body image” scale, showing that participants developed a more positive attitude toward their own body. According to Guenther et al., pain has a negative influence on body image²⁵). Therefore, the reduced back pain due to SI, and to some extent to FF, might explain these findings. The fact that vital body dynamics improved only in the SI group might be explained by the one-to-one setting, as well by earlier findings showing that physical contact (i.e. touch during the SI sessions) may lead to a better relationship with one's own body, and to a more positive body image when compared to exercises not involving contact²⁶).

Some limitations of this study should be mentioned. First, pain ratings were lower compared to other intervention studies^{21, 25}) and as such our participants cannot be seen as typical clinical back pain patients. Second, the relatively short study period could be considered a weakness, although this short intervention period nevertheless seemed to significantly improve back pain and body image. Clearly, however, longer intervention periods (of at least 6 months) are needed to study adaptation of the fascial tissue via FF or SI. Additionally, in the future, a study group with clearly diagnosed clinical pathologies should be investigated. It is also important to note that people with physical ailments tend to have a highly positive attitude towards exercise and manual therapy; they actively hope for an improvement, or even a cure, for their pain. This could have influenced the present outcomes. Furthermore, due to the fact that the present study did not include a control group or a control condition (e.g. physical contact without manipulation, or a period without treatment), a placebo effect cannot be ruled out. A further limitation is the unblinded study design, but this was unavoidable due to the application of manual physical treatments²⁷). The study investigator personally instructed the participants to fill in the questionnaires to the best of their ability, with honesty and without any regard for the investigator. However, it remains possible that the results may have been influenced by the abovementioned factors.

In conclusion, after only three sessions, SI showed a significantly positive effect on perception of back pain and body image, and FF showed a trend towards a reduction in back pain and a significantly positive effect on attitudes towards one's own body. As both interventions had an almost identical effect on body perception and the perception of back pain, they can be viewed as viable alternative forms of therapy and training for people with non-specific low-intensity back pain, and thus may represent additional and effective multimodal therapeutic approaches within the field of prevention and rehabilitation. For effective back pain treatment, an additional set of physiotherapeutic or medical treatments is highly recommended. The effects of active and passive manipulation of the fascial tissue should be subject to further scientific research and studies.

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