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LONG ABSTRACT

A New Educational Program for Improving Posture and Quality of Life among Students Using the Feldenkrais and MAP Methods.

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Introduction

1. Background

Man's pursuit for the meaning of quality of life is as ancient as Aristotle's adage on human goodness and Maimonides's proverbial *"A healthy mind in a healthy body*" (Leven, 2011). Since then and up until today, it is commonly accepted that in order to preserve quality of life one needs to maintain a healthy body (Gariciaetal et al, 2013; Oliveira et al, 2013), one of the parameters of which is the preservation of correct posture (Lmiolek, 2008). By maintaining the body's proper pose, without overloading the joints and while using the relevant muscles correctly, one can prevent skeletal, muscular, cardio-vascular and neurological problems, reduce medical expenses and monetary loss due to absence from the workplace, and prevent emotional distress related to concerns such as self-image (Durmuz et al, 2011).

Renowned scholars of quality of life, Bandura (2011) and Seligman (2008), have noted that quality of life is the subjective feeling at any given moment based on the perception of all aspects - health, professional, marital, social, economic etc - of the individual's life in relation to the society of which he or she are part, and to his or her past and projected future (Bandura, 2011).

Another relevant perception of quality of life lies with Dr. Moshe Feldenkrais (1904-1984). Feldenkrais stresses the unity between the mental and the physical, i.e. emotional, intellectual, sensory and motile states of being as conducive to high quality of life. Of these, Feldenkrais stressed motility as that which, by altering the other states, determines one's measure of quality of life (Alon, 1994; Feldenkrais, 1967).

To create this balance, Feldenkrais formulated an innovative educational method based on philosophical and practical-physical approaches (Feldenkrais, 1967). According to his method, improving and perfecting motility results in posture improvement. Improvement and perfection of these abilities are contingent on neural and behavioral changes that occur while exercising in gentle unique techniques.

Other, more conventional methods for posture improvement are based on the strengthening of certain posture muscles: abdominal, pelvis and back (Kloubec, 2010; Sarig, 2002). Accordingly, control over the pelvic floor provides the basis for organizing posture, which in turn, improves functional abilities, links body and mind, and leads to the improvement of quality of life.

To unify the advantages of the Feldenkrais method with more conventional methods the conductor of this research created the MAP (Motion and Posture) program. To test this program, Feldenkrais classes in which posture muscles are strengthened were chosen.

Participants were instructed to perform the following: 1. Strengthening those muscles by regular Feldenkrais exercise .2. Selecting Feldenkrais classes that activate the muscles merely by positioning the body in sitting position, walking on all fours or standing on two.

Literature shows that employment of the Feldenkrais method improves quality of life (Netz & Lidor, 2003). Yet there is no evidence as to a linkage between implementation of the Feldenkrais method, or any other aforementioned method, and posture improvement. The primary goal of this study is to examine the nature of the connection between body posture and quality of life while focusing on two key issues:

1. Whether and how does practicing the Feldenkrais method improve quality of life and body posture?

2. Whether and how does practicing the MAP method (a combination of Feldenkrais and strengthening of posture muscles) improve quality of life and body posture?

Thus, the research hypotheses were:

Hypothesis 1: The quality of life— both the physical status (back, movement, sensation) and emotional state (feelings, mood, thought) - of the participants (all the participants, from the Feldenkais group and MAP group) of the new educational program, will improve.

Hypothesis 2: General posture and spinal column curvature angles (e.g. Kyphosis and Lordosis) of the participants (all the participants, from the Feldenkais group and MAP group) of the new educational program, will improve.

Hypothesis 3: Positive correlation will be found between posture indices (Kyphosis and Lordosis) and quality of life indices (physical status and emotional state).

Hypothesis 4: Differences in quality of life and posture will exist among participants exercising with the Feldenkrais method in comparison with participants exercising with the MAP program.

2. Methodology

Research Approach

Due to the fact that the research involves professional practice, and that some of its goals are to examine, develop and promote the researcher's fields of interest, a pragmatic paradigm was found to be the most suitable. Accordingly, an integrative methodology combining both quantitative and qualitative approaches and tools was selected. The quantitative research consisted of an experimental part and the qualitative kind emphasized action research (Bocos, 2007; Bryman, 2006; Creswell, 2009).

Research Population

The research population included 243 students, aged 18-28, from the *"Technion"* - Israel Institute of Technology. Half of the students participated and helped in examining the Feldenkrais intervention program, while the other half participated in the MAP intervention program.

Research Tools

1. The Quantitative Research Tool:

In order to ascertain the connection between the program and improvement of physical status and quality of life, all participants were measured at two points in time - at the beginning and at the end of the intervention program. A small group of students (N=79, 32.5%) were also measured in the middle of the semester.

Measures:

a. Quality of life survey (SrS-22) - Primary tool for checking the quality of life. This survey included 22 items related to back and spine health and its effect on quality of life (see Appendix 1)

b. Digital Inclinometer - The spinal column was measured by two sub-measures during each measuring point: (a) Kyphosis was measured in upper (C7) and lower (T12) points. (b) Lordosis was measured in upper (T12) and lower (L5) points.

Quantitative Measure Data Analysis:

Analysis of Variance with repeated measures was conducted in order to test the difference between the initial status of the participants before the intervention program and their status at the end of the program. The Pearson test was applied to test the connection between variables.

2. Qualitative Research Tool:

"Lesson effect" Survey - This open-ended survey was designed specifically for this study and contained five open-ended questions pertaining to the processes and effects of the research program. The questions were related to both theoretical learning procedures (understanding the learned material) and practical learning procedures (changes in movement and movement habits) (see Appendix 2).

Qualitative Measure Data Analysis:

The qualitative analysis was employed to further prove the validity of the theory and educational program presented in the study, thereby strengthening the quantitative findings. Moreover, the qualitative findings might indicate the effect of posture improvement programs on the enhancement of quality of life.

Chapter I: **The New Educational Program**

I.1 Correct posture as a significant parameter in our quality of life

I.1.1 Quality of Life

Throughout history, various definitions of the expression "the common good" has been proposed, such as "happiness" and "the good life" (George & Bearon, 1980), and over the past few decades, as "quality of life". The extensive literature dealing with research on "quality of life" reveals that a clear and consistent general definition does not exist for the term "quality of life" and its origin is unknown (Bandura, 2011). The unlimited number of definitions attached to this term indicates that no consensus exists among the different researchers regarding how to define it and how to construct its dimensions (Shye, 1989).

Despite attempts to define the expression "quality of life" in different social contexts (family, happiness, cultural, economic), one of the fields in which the largest amount of literary research has been invested regarding "quality of life" since the end of the last century until today, is in the field of health. In light of this important factor, a number of theories on quality of life have been formulated over the past few years:

A. Bandura and Seligman

These two researchers claim that both wellbeing and quality of life are terms perceived as general descriptions of life of people in certain situations. While in the past quality of life was measured solely by economic means, today it is obvious that the term needs to be extended to the fields of psychology and the behavioral sciences.. To

understand or measure quality of life, one must refer to its many components, such as age, marital status, political state, health, etc. (Bandura & Conceicao, 2008 & Seligman, 2008).

B. "Health Promotion"

Formulation of the "Health Promotion" theory began over the last few years. It includes reaching out to the general public and offering instructions how to increase participation in activities such as physical exercise, that promote good health and quality of life, , in order to prevent diseases and improve both physical and mental health (Terra et al, 2012).

C. Feldenkrais:

According to Dr. Moshe Feldenkrais (1904-1984), a person is capable of having a high quality of life when he has physical and mental unity, though chances are that this unity will break due to various life situations. To preserve this balance and improve the wellbeing of the person, Feldenkrais treated movement as a means to improve other components in the wellbeing of a person, such as insight, sensitivity and emotions (Feldenkrais, 1967, 1976, 1978).

The term **"quality of life"** in the current study can be considered in the following way: on the one hand, the quality of human life is made up of the current subjective perception of the person on their different life aspects (health, emotional) and in relation to the environment in which they live and their past and future expectations; on the other hand, it is made up of that person's ability to have inner unity between all the parts of their being (movement, insight, sense and emotion).

The extensive professional and academic literature dealing with the link between quality of life and postural defects shows that correct body posture is one of the essential indices for the human body to function in harmony (Lmiolek, 2008).

I.1.2 Correct Posture

This study was created in order to examine the posture state and postural defects and their influence on students' quality of life. This study also examined the effects of different intervention plans on postural and quality of life.

For the purposes of this study, the term "**correct posture**" is defined as: The presence of correct relations between the body and all its parts at any given moment, while coping easily and effectively with gravity, from an energetic perspective.

There are three body systems that are directly connected to movement and posture: the nervous system that is responsible for all our bodily activities and is the one that sends

commands to the muscles regarding what, how, to what extent and when to carry them out; the muscular system that moves the bones in the body; and the skeletal system that includes the bones and the joints between them

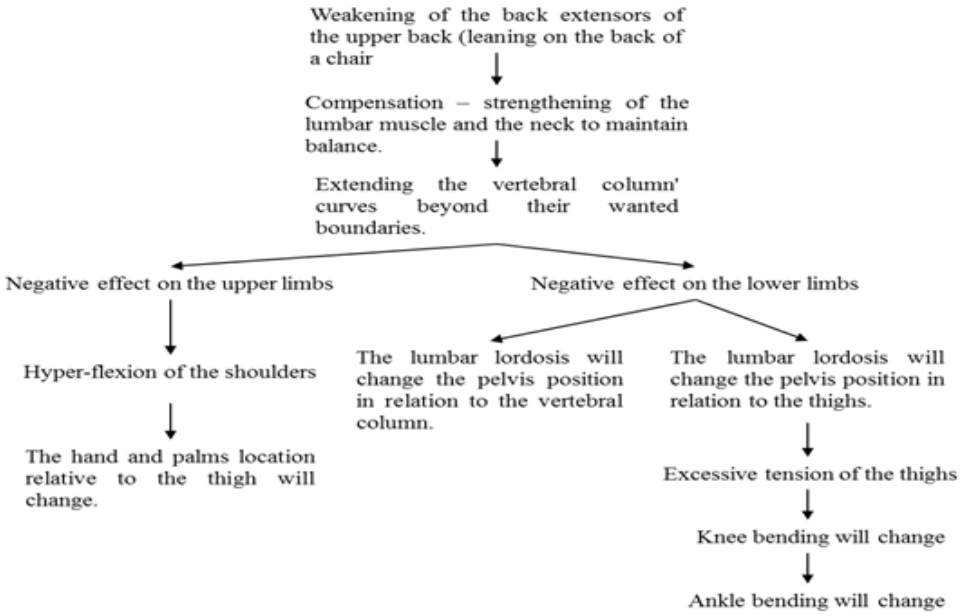
Many factors can affect posture, such as: heredity – physique, bone length and weight; age – over the years changes occur in the curvature of the spine, the angles of the leg joints and the feet; sex – women are more flexible and have a higher percentage of fatty tissue; environmental conditions – whether the person is occupied in a physically active position or sits all day studying ; emotional state – whether the person has an abundance of self-confidence or none at all (Nourbakhsh et al, 2001 ; Youdas et al, 2000; Dawson-Cook, 2011; Morin Lang-Tapia, 2011).

Lack of harmony where posture is concerned can lead to a number of problems. For example: shortening of the lower back muscles can also cause limitation to the diaphragm muscles, which are an integral part of the normal breathing process. Pressure and shortening of the neck muscles will cause the cervical vertebrae to be internally compressed to the extent that normal blood flow (carrying oxygen) from the heart to the head will be detrimentally affected, and so on (Solberg, 2009).

Correct posture development is formed in an ordered and unvarying way from infancy to maturity, and is of a similar nature in the majority of human beings. In the same way, a postural "disorder" leading to postural defects is also a process that develops in a similar way in most people.

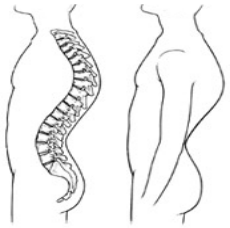
I.1.3 Posture Impairments:

Figure 1: Impairment Development Sequence



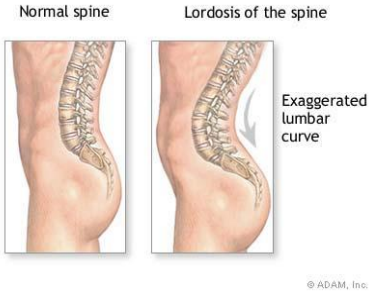
The figure indicates that incorrect use of the back muscles is at the "top of the pyramid" where responsibility for posture impairment is concerned. This incorrect use is found primarily in many people in the extension of their upper back muscles – Kyphosis - and in compression of their lower back muscles – Lordosis. Both these impairments are the focal points of reference and consideration during the physical examinations carried out in this research.

Kyphosis



The professional interpretation of the term "Kyphosis" is the normal curvature of the upper back, between T1 and T12, in its proper angles, 26-40 degrees (Lamatrina, 2010; Schnake, 2010). The popular interpretation of "Kyphosis" is an excessive anticline in the upper back that exceeds these angles

Lordosis



The professional interpretation of the term "**Lordosis**" is the normal syncline of the lower back, between L1 and L5, in its proper angles, 34-56 degrees (Lamatrina, 2010; Schnake, 2010). The popular interpretation of "Lordosis" is an excessive syncline of the lower back that exceeds these angles.

Proper professional concepts might have originated in popular language as descriptions of incorrect situations as a result of the wide distribution of the impaired situations (most of society), both for Kyphosis and Lordosis. Thus, this research will also use the terms "Kyphosis" and "Lordosis" for describing the impaired states that require improvement.

In order to avoid or treat these postural impairments and their consequences, the patterns of individual posture created in a human being must first be diagnosed by means of different data collection. The measures used include talking with the person who shares his pain, his movement habits, his childhood development, etc., observation by the therapist of all the client's states when standing, sitting and lying down; the gentle touch of the therapist on the client to feel tension in the different muscles and assess whether joints move freely; and use of medical means such as Xrays, MRI, bone density scans, etc. The correct form of treatment is chosen based on the diagnosis.

I.2 Educational Programs for Improving Posture

I.2.1 Existing Educational Programs for Improving Posture

A. Sarig – strengthening the pelvic floor muscles as a basis for organizing all muscular and other body posture components (Sarig, 2002).

B. Pilates – acknowledging the ability of the body-mind connection to bring about an improvement in quality of life by means of improving function by controlling the muscles (Cruz-Ferreira, 2011; Kloubec, 2010).

C. Mézières – by means of sensitivity and wisdom one must find the hidden pain found mostly in the lower back, and hidden by posture pains in other body locations (Brtra, 1979)

D. Alexander (1904) – the objective of the method is to teach people how to consciously bring about mental and physical balance, thus improving functions and preventing impairments (Stratton, 2001).

E. Feldenkrais – Dr. Moshe Feldenkrais believed that people are born with correct natural movements, but over the years they adapt wrong, and even harmful, movement habits. This can gradually be corrected by developing body awareness (Feldenkrais, 1967).

The current research examined the connection between posture and quality of life by means of two educational programs for the improvement of posture.

I.2.2 The Research Educational Programs

A. The Feldenkrais Educational Method

According to the educational method of Dr. Moshe Feldenkrais, movement is the practical way to improve quality of life. In light of this, Feldenkrais initiated hundreds of motility classes that include several principles:

1. Neutralizing gravity – most of the exercise is performed in unconventional physical positions that neutralize gravity (such as lying on the back, or lying in other ways). These positions create changes in relation to gravity, thus enabling the muscles to "disregard" their customary activity and to contract, thus providing a new way to work in a completely different neuro-muscular manner.

2. Much repetition of every exercise.

3. Gentle movements that reduce muscular tension.

4. Using different variations of the same exercise.

5. Creating a relaxed atmosphere in the class.

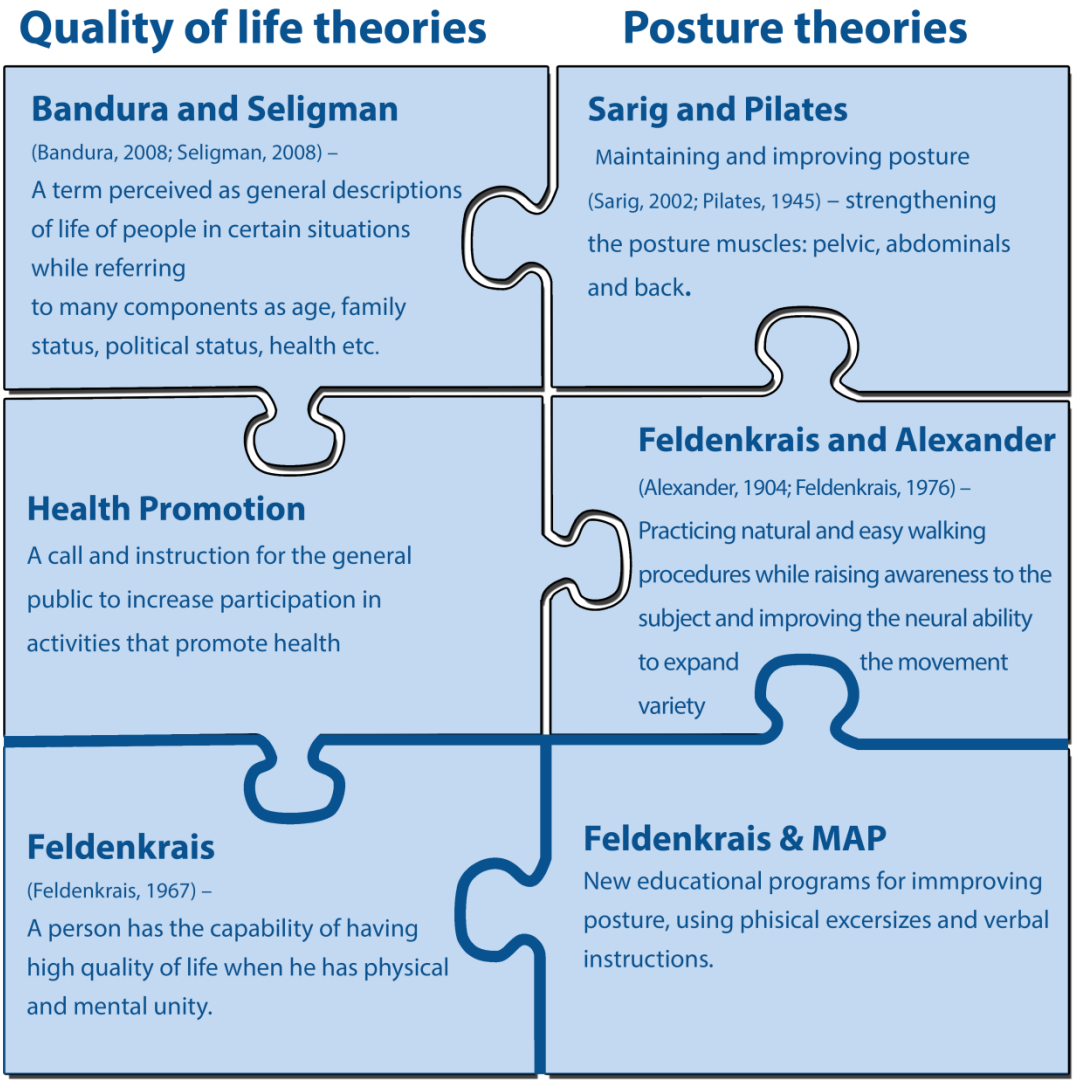
When exercising according to these principles, people learn to reorganize their body into a posture that may lead them to move naturally in a better and healthier way (Alon, 1994; Feldenkrais, 1967).

B. The MAP (Motion and Posture) Educational Method

This method is both similar and different from the Feldenkrais method in many aspects. The practical lessons, as well as the guidance and educational process accompanying them, are all adapted from the Feldenkrais method. However, the MAP method chooses Feldenkrais lessons that have one of the following two characteristics:

lessons that are taught in body positions that cope with gravity such as sitting, standing and walking, and lessons taught while lying down but using muscles from the body center, such as the back, stomach and pelvis. These are the muscles that are responsible for body posture. The rationale behind these choices is that strengthening the posture muscles, as well as exercising and guidance in different body positions, will allow ”copying” and preserving the advantages of the Feldenkrais method for use in everyday life when needing certain muscles to cope with gravity.

Figure 2: Main Theories



I.3 Gap in Knowledge

Research literature suggests that some of the topics covered by this research have been studied to a certain degree, and others not enough or not at all, but in any event a gap exists between the large number of people (some 90% of adults) who suffer from impaired posture and the research literature dealing with the subject.

Existing studies deal with the following participants:

1. The connection between prolonged sitting and reporting back pain and impaired posture (Geldhof el al, 2007; McEvoy, 2005)

2. The implications of pain from impaired posture on the quality of life of people suffering from it (Lmiolek, 2008).

3. The implications of strengthening muscles, especially those of the back, on posture improvement (Kloubec, 2010)

4. The connection between the Feldenkrais method and posture improvement (Netz & Lidor, 2003).

The participants that have not been sufficiently researched or have not been researched at all are:

1. No specific reference has been made to the student population that may suffer severely owing to prolonged hours of sitting (Kasukawa et al, 2011).

2. No reference exists for other methods that educate towards improving posture, such as the Feldenkrais method.

In addition, the few existing studies that examine how posture may be improved by physical activity do not offer clear findings that may lead to an understanding of how to ease posture and improve it (Tulder, 2000; Philadelphia Panel, 2001; Hayden et al, 2005; Middelkoop et al, 2011).

Thus, this study is the first to examine whether a connection exists between the Feldenkrais method or the new MAP method, and quality of life amongst 18-28 year old students, and what form it takes.

Chapter II: **The Design and Methodology of the New Educational Program**

II.1 The Research Approach

Since the research was intertwined with regular professional work and some of its goals were to examine, develop and promote the researcher's fields of interest, the pragmatic paradigm was the correct fit for the research.

The goal of the current study was to enrich the existing knowledge base on 'correct posture' and 'quality of life'. Therefore the **mixed method** was chosen, as it intertwines the quantitative approach and tools with qualitative approach and tools. The **quantitative** tools use accurate physical examinations to test the effects of educational programs on posture improvement. The **qualitative** tools allow an understanding of the processes the subject experienced during the study, enabling the qualitative tools to enrich the quantitative.

The strategy of this mixed research was **'Sequential Explanatory Design'**:

This strategy is a popular and typical one for mixed methods and it is used when the quantitative research is primary, and the qualitative data are secondary. Its goal is to

explain and interpret the quantitative outcome by gathering and analyzing qualitative data. This strategy is based on literature theory (Bocos, 2007; Bryman, 2006 ; Creswell, 2009**)**.

The quantitative research consists of an experimental part and the qualitative emphasizes action research.

II.1.1 Research Questions

The main question is: What is the connection between body posture and quality of life?

Additional questions that arise include: Whether and how does practicing the Feldenkrais method improve quality of life and body posture?

Whether and how does practicing the MAP method (a combination of Feldenkrais and strengthening of posture muscles) improve quality of life and body posture?

Research Hypotheses:

Hypothesis 1: The quality of life— both the physical status (back, movement, sensation) and emotional state (feelings, mood, thought) - of the participants (all the participants, from the Feldenkais group and MAP group) of the new educational program, will improve.

Hypothesis 2: General posture and spinal column curvature angles (e.g. Kyphosis and Lordosis) of the participants (all the participants, from the Feldenkais group and MAP group) of the new educational program, will improve.

Hypothesis 3: Positive correlation will be found between posture indices (Kyphosis and Lordosis) and quality of life indices (physical status and emotional state).

Hypothesis 4: Differences in quality of life and posture will exist among participants exercising with the Feldenkrais method in comparison with participants exercising with the MAP program.

II.2 Research Stages

A pilot study was carried out during the spring semester of 2011 where the main aspect tested was the digital "Inglinimometer" instrument and its benefits. The students were included in the research plan.

The research included two parts. The first research part took place during the winter semester 2011/2012. The second part took place during the spring of 2012.

Because of technical difficulties, some of the collected data was unusable. In addition, some changes occurred between the two parts that were related to the

research tool and the improvement in the examiners' skills. Therefore, the second part of the research constitutes its main part.

ALL the participants (243) in both parts underwent three stages:

Stage 1: At the beginning of the research the participants completed the quality of life questionnaire, and spinal curvature measurements were taken (Kyphosis and Lordosis).

Stage 2: During the research, the participants took part in the intervention program (14 meetings/lessons). Half of them took part in the Feldenkrais program and half in the MAP program.

Stage 3: At the end of the research, the same tests were carried out as in Stage 1.

Additional tests were made on SOME of the research population during the second stage: spinal curvature measurements before and after the lesson, measuring the height of the research population before and after the lesson, recording their mood (on a scale of 1 – 10) at the end of the lesson, and participation in the qualitative part of the research.

II.3 Research Population

The research population included 243 students aged 18-28 from the "*Technion*", the technological institute in Haifa, Israel. 70% of the students are female. The students were examined during their ongoing studies and receive a useful tool for coping with physical or mental difficulties that arise during their studies and their life in general. Additional considerations for choosing students from the *"Technion"* are: 1. The researcher has been teaching the Feldenkrais method for 15 years at the *"Technion"*, so accessibility to students is relatively simple. Moreover, the researcher knows the personality characteristics of this population section. 2. People aged 20-30 are mature enough to understand instructions for practicing, embedding and applying the method both inside and outside the classroom. 3. People of this age are young enough to experience a dramatic effect from the intervention program on their physical status and their quality of life. 4. Students are characterized by a strong intellectual curiosity, by mental flexibility for accepting new methods, and by their ability to respond well to new programs.

The participants of the study were students who chose and were accepted at the Technion during 2011-2012, students who chose and were accepted to one of the four

classes of Feldenkrais and MAP, and students who wanted to participate in the research. Thus it is clear that the sampling program is a **convenience sampling**.

II.4 Research Tools

A. The following quantitative measurements were used in the current study

A.1. SrS-22 - Quality of life Questionnaire (see Appendix 1) - Measuring quality of life was conducted by means of the SrS-22 questionnaire (From "Health State Measure"). This questionnaire includes 22 items relating to back and spine health and how they affect quality of life, such as *"If you had to spend the rest of your life with your back as it is right now, how would you feel about it?"* Participants were requested to rate each question on a Likert scale with 5 degrees. The questionnaire contained several questions relating directly to the back status (4 items). All other questions concerned themselves with the effect of the back on other aspects of life, first and foremost on the emotional/mental aspect (11 items), and others on general physical activity (6 items). The last aspect examined was the financial one (Harris & Brown, 2010; Horowitz et al, 2008). Due to the minimal number of questions (1) on the financial aspect, and because all the participants maintained that the state of their back had no effect on their financial situation, this aspect did not feature at all in the data analysis and the conclusions.

A.2. **VAS (Visual Analog Scale)** - Participants were asked to rate their general mood at the end of five random sessions during the semester. Mood was measured by the Likert scale between 1 (extremely low) and 10 (extremely high) (Shye, 1989).

A.3. Digital Inclinometer – The vertebral column was measured by two sub-measures at each measuring point: (a) Kyphosis – was measured in an upper (C7) and lower (T12) point using the Digital Inclinometer, after which an absolute gap was calculated between these points. (b) Lordosis - was measured in an upper (T12) and lower (L5) point using a Digital Inclinometer after which an absolute gap was calculated between these points as well. These measures were taken pre-intervention, post-intervention and in a single class in the middle of the semester (Le Huec et al, 2012).

A.4. Metric Tape Measure - Height difference was measured during one random session, and was calculated between the beginning and the end of the session (in millimeters) (Kloubec, 2010).

B. In the current study, the following qualitative measures were used:

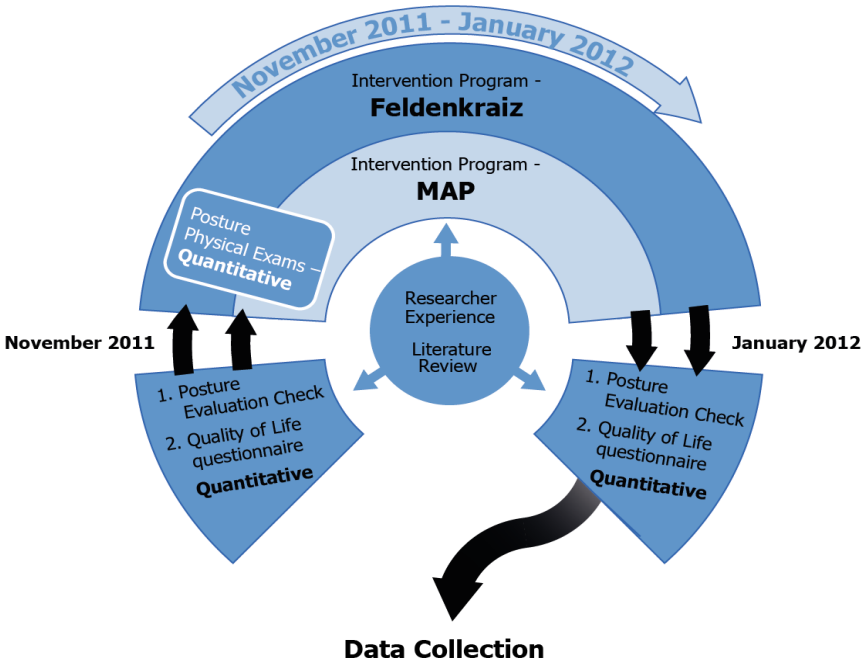
The "Lesson effect" Questionnaire: The open questionnaire (see Appendix 2) was prepared specifically for this study by the researcher and contains five open questions

that enable respondents to answer as they see fit, describing the processes they undergo within the research program and how it affects them.

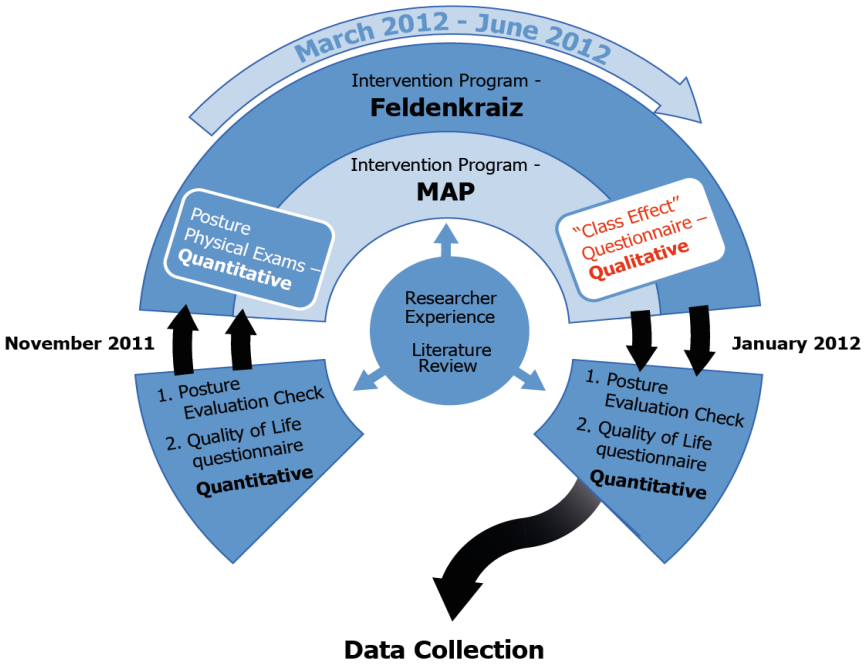
This qualitative questionnaire presents the participants content-directed yet open questions from the endless possibilities with which the participants can answer, and was constructed with the intention that they can feel free to answer as they please, which proved it.

Figure 3: Research Design

Initial Study, First Semester



Main Study, Second Semester



II.4.1 Intervention Programs Activities

Table 1: Description of the Intervention Programs Activities

Class No.	Feldenkrais	MAP
1	Choosing movement as a factor for behavioral change.	Choosing movement as a factor for behavioral change.
2	Vertebral column: structure, functions, movements, development.	Vertebral column: structure, functions, movements, development.
3	Understanding posture impairments in the sagittal plane of the vertebral column.	Understanding posture impairments in the sagittal plane of the vertebral column.
4	Understanding posture impairments in the coronal plane of the vertebral column.	Understanding posture impairments in the coronal plane of the vertebral column.
5	Understanding limb structure: bones, arthritis, movements.	Understanding limb structure: bones, arthritis, movements.
6	Posture impairments in limbs	Posture impairments in limbs
7	Hip: structure, movements, functions, pathology.	Hip: structure, movements, functions, pathology.
8	Understanding the delicate anatomical structure of the nape and its functions.	Understanding the delicate anatomical structure of the nape and its functions.
9	Treading and walking.	Treading and walking.
10	The principles for sitting upright correctly.	The principles for sitting upright correctly..
11	Understanding the four lying positions: back, stomach and sides.	Understanding the four lying positions: back, stomach and sides.
12	The link between cortex cells and muscle activation.	The link between cortex cells and muscle activation.
13	Hands in the digital age.	Strengthening the bones while performing correct movement
14	The eyes and their functions in the post-modern era.	The significance of running and hopping = aerobic activity

II.5 Data Analysis

In order to test differences between groups and along measurement points over time, analysis of **Variance** (ANOVA) repeated measures were conducted. This procedure is used to determine whether significant gaps exist between pre- and post-measures among the groups. The variance was tested in relation to two participants in the research: A. Group difference – examining the differences between the group that learned the integrated program (MAP) and the participants who learned the original program (Feldenkrais). B**.** Difference in time period – examining the difference between the participants' initial status prior to the intervention program and their status at the end of the program. In order to test correlations between variables (for example, back condition and quality of life), a **Pearson** test was conducted.

Chapter III: **The Findings of the Research**

III.1 Part One – Quantitative Analysis

III.1.1 Findings emerging from hypothesis 1

Hypothesis 1: The quality of life— both the physical status (back, movement, sensation) and emotional state (feelings, mood, thought) - of the participants (all the participants, from the Feldenkais group and MAP group) of the new educational program, will improve.

A. SrS-22 - Quality of life Questionnaire

A Repeated Measures procedure was conducted among the whole sample. The independent variable in this analysis was the group type (Feldenkrais vs. MAP) and the dependent variable was quality of life.

Table 4 shows descriptive statistics of general quality of life and sub-domains of quality of life among the groups:

Table 2: Sub-Domains of Quality of Life and General Quality of Life

Measure	Pre-intervention		Post-intervention	
	Feldenkrais (N=39)	MAP (N=100)	Feldenkrais (N=39)	MAP (N=100)
Back Condition	3.75 (0.74)	3.83 (0.77)	3.90 (0.76)	3.97 (0.71)
Emotional Condition	3.64 (0.47)	3.54 (0.48)	3.83 (0.49)	3.79 (0.57)
Physical Condition	3.87 (0.57)	3.85 (0.53)	3.89 (0.55)	3.89 (0.53)
General Quality of Life	3.63 (0.41)	3.54 (0.44)	3.69 (0.46)	3.65 (0.49)

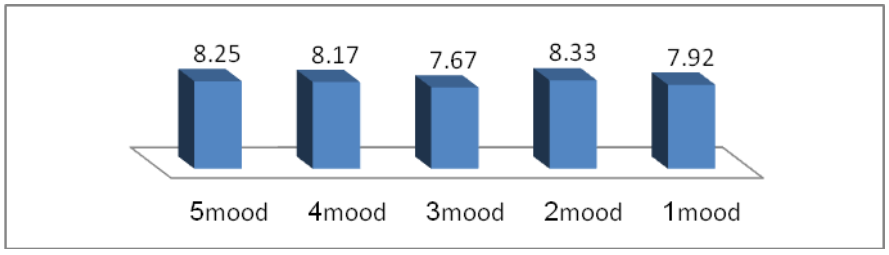
Results at table 2 show that general quality of life was significantly improved among participants in both groups between pre-intervention (M=3.57, SD=0.43) and post-intervention (M=3.66, SD=0.48) ($F(1,137)=13.819$, $p<0.001$, $\mu^2=0.092$).

B. VAS (Visual Analog Scale)

In order to expand and reinforce the findings of the questionnaire about quality of life, the mood of some of the participants was also measured immediately following the end of the class.

In order to explore differences in improvement of **Mood**, a Repeated Measures procedure was conducted among the whole sample. The dependent variables were mood measures.

Figure 4: Differences between Mood Measures along Five Sessions



The analysis at figure 4 indicates no significant differences between mood measures along these five sessions ($F(4,44)=1.920$, $p=0.124$, $\mu^2=0.149$).

III.1.2 Findings emerging from hypothesis 2

Hypothesis 2*:* General posture and spinal column curvature angles (e.g. Kyphosis and Lordosis) of the participants (all the participants, from the Feldenkais group and MAP group) of the new educational program, will improve.

A. Digital Inclinometer

A.1. Digital Inclinometer- Pre- and Post-Intervention Program Sample:

In order to examine this hypothesis, a Repeated Measures procedure was conducted among the whole sample. The independent variable in this analysis was the group type (Feldenkrais vs. MAP) and the dependent variables were the absolute gaps of Kyphosis and Lordosis between pre-intervention and post-intervention.

Table 3 shows the descriptive statistics of Kyphosis and Lordosis gaps between pre-intervention and post-intervention according to groups.

Table 3: Kyphosis and Lordosis Gaps Between Pre- and Post-Intervention

Measure	Pre-intervention		Post-intervention	
	Feldenkrais (N=69)	MAP (N=54)	Feldenkrais (N=69)	MAP (N=54)
Kyphosis gap	20.55 (7.87)	14.66 (7.18)	16.36 (7.11)	15.76 (8.29)
Lordosis gap	9.35 (8.40)	18.98 (8.26)	6.97 (4.89)	12.18 (7.84)

Results at table 3 show that in general, the Kyphosis gap was unchanged among participants of both groups between pre-intervention ($M=17.96$, $SD=8.10$) and post-intervention ($M=16.09$, $SD=7.62$) ($F(1,121)=2.395$, $p=0.124$, $\mu^2=0.019$).

Regarding Lordosis, results showed that among participants of both groups Lordosis decreased (improved) between pre-intervention ($M=13.60$, $SD=9.59$) and post-intervention ($M=9.27$, $SD=6.85$) ($F(1,118)=27.293$, $p<0.001$, $\mu^2=0.188$).

A.2. Digital Inclinometer- Pre- and Post Single Lesson:

In order to examine differences in the spinal column measures following a single lesson, a Repeated Measures procedure was conducted among some of the sample. The independent variable in this analysis was the group type (Feldenkrais vs. a MAP) and the dependent variables were absolute gaps of Kyphosis and Lordosis between the beginning and the end of the session.

Table 4: Kyphosis and Lordosis gaps - Single Lesson

Measure	Beginning of session		End of session	
	Feldenkrais (N=42)	**MAP (N=35)**	**Feldenkrais (N=42)**	**M.A.P (N=35)**
Kyphosis gap	16.52 (8.89)	17.54 (10.17)	16.16 (8.43)	15.20 (9.54)
Lordosis gap	11.00 (9.46)	13.82 (11.94)	11.68 (9.43)	12.08 (10.60)

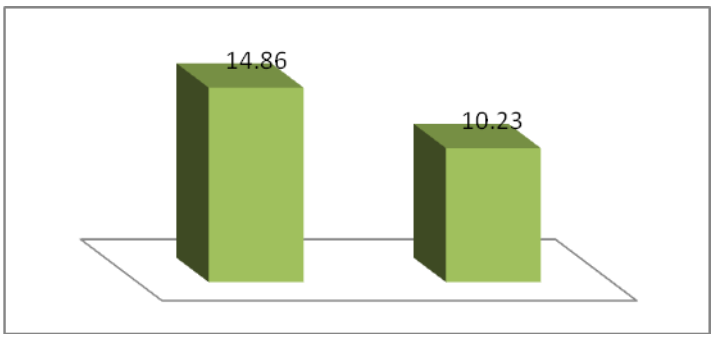
The results at table 4 show that the Kyphosis gaps, and the Lordosis gaps in a single lesson, were unchanged among participants of both groups between the beginning and the end of the session.

B. Metric Tape Measure

In order to expand and reinforce the quantitative and physical findings gathered by the Digital Inclinometer, the height of some of the participants was also measured at the beginning and end of a session.

In order to examine this hypothesis, an Analysis of Variance (ANOVA) procedure was conducted with the dependent variable being height difference and the independent variable being group type.

Figure 5: Height Differences - Single Lesson



The results at figure 5 show a significant improvement in height between the beginning and the end of the lesson.

III.1.3 Findings emerging from hypothesis 3

Hypothesis 3: Positive correlation will be found between posture indices (Kyphosis and Lordosis) and quality of life indices (physical status and emotional state).

In order to examine this hypothesis, Pearson correlations were produced between improvement in Kyphosis/Lordosis and Quality of life measures as presented in Table 5 and Table 6

Table 5: Correlations Between General Kyphosis/Lordosis and Quality of life

	General Quality of Life	Back Condition	Emotional Condition	Physical Condition
Kyphosis Gap	-.009	.080	,045	,004
Lordosis Gap	.129	.066	.123	.137

Table 6 presented correlations between variables among each group separately.

Table 6: Groups' Quality of Life and Posture

	General Quality of Life		Back Condition		Emotional Condition		Physical Condition	
	Feld.	**MAP**	**Feld.**	**MAP**	**Feld.**	**MAP**	**Feld.**	**MAP**
Kyphosis Gap	.100	.061	.002	.586	.067	.050	.173	.096
Lordosis Gap	.063	.224	.083	.111	.057	.183	.200	.150

As indicated presented in Table 5 and Table 6 no significant correlations were found between improvements in Kyphosis or Lordosis and Quality of Life measures among the general sample.

III.1.4 Findings emerging from hypothesis 4

Hypothesis 4: Differences in quality of life and posture will exist among participants exercising with the Feldenkrais method in comparison with participants exercising with the MAP program.

A. Quality of life

Table 7: Quality of Life Sub-domain Gaps among the Groups

Measure	Feldenkrais (N=38)	MAP (N=100)
Back Condition	0.26 (0.38)	0.41 (0.34)
Emotional Condition	0.19 (0.19)	0.35 (0.28)
Physical Condition	0.16 (0.31)	0.24 (0.23)

Despite the impressive results regarding quality of life of both groups, the results at table7 show that no difference was found between the gaps among both groups ($F(3,408)=1.696$, $p=0.167$, $\mu^2=0.012$), i.e.. the gaps were similar.

B. Posture

Kyphosis (between pre-intervention and post-intervention) - While no difference was found in the Kyphosis gap among participants of MAP, the Kyphosis gap decreased and improved among participants of the Feldenkrais method.

Lordosis (between pre-intervention and post-intervention) – A significant interaction was found between group type and difference in Lordosis gaps ($F(1,118)=6.323$, $p<0.05$, $\mu^2=0.051$). Participants of MAP showed higher improvement of Lordosis gaps.

III.2 Part Two - Qualitative Analysis

In order for a scientific nature to be attributed to the participants' responses, an encoding process was initiated every few stages. In the **initial stage,** the participants' responses to each question in the questionnaire were sorted and reorganized in a different order. The reorganization involved a statement describing one of the following single categories on its own: feeling, thought, sense and movement. These categories comprise the main components of the Feldenkrais method and similarly, of the MAP method.

Restoring the participants' responses according to categories provided the foundation for the **second stage,** in which the statements provided below each category were taken and reorganized into themes.

First theme: Improvement effects of the single lesson

Second theme: Effects of all the educational programs on improved posture

Third theme: Improvement of quality of life as a cumulative effect of posture improvement.

In the **third stage**, each theme was divided into a number of categories. After providing a heading for each category and relating the category to the research hypotheses, the relevant question was presented under this heading, in the same way as in the qualitative questionnaire. These categories allowed for confirmation or rejection of the research hypotheses. (See Appendix 3 for a summary of the findings of the categories and themes).

The first theme (the beneficial effects of the single lesson) includes all of the participants' answers that describe the immediate effects that a certain lesson had on them. Some examples for the answers were: "upright sitting; a more upright standing; straight back, the shoulders pulled backwards; more balanced feet"

The second theme (the effects of all posture educational programs) presents the analysis conducted to the answers of the participants regarding the change and improvement they had following all posture improvement educational programs. Some examples for the answers were: "correct organization of organs in everyday life; avoidance of harmful movements; I've changed movement habits I didn't know were harmful".

Those findings connect and affirm the second hypothesis of the study, that participation in the intervention program will improve the posture.

The third theme (Improvement of quality of life as a cumulative effect of posture improvement) presents the perception of Dr. Moshe Feldenkrais who analyzed the term "quality of life" based on four components: motion, insight, sense, and emotion. Some of the described feelings of improving quality of life were only physical references "as a decrease in back pains, some have solely mental references as success; self-confidence", and most of them may be associated with both the mental aspect and the physical one as "changing general feeling", being general from a wide perspective of the entire personal experience. Those findings connect and affirm the first hypothesis of the study, that participation in the intervention program will improve the quality of life.

From all of the answers regarding the improvement and cumulative changes, many referred to physical states, but also to the quality of life components. Therefore, we can see that here is a trend to improve the quality of life by improving the posture, as said at the third hypothesis.

Chapter IV: **The Conclusions of the Research**

IV.1 Conclusions Regarding Improving Quality of Life

The **findings** showed a significant improvement in the quality of life of the participants due to both posture improvement programs, and thus the **factual conclusion** is that quality of life can be improved by the Feldenkrais and MAP educational movement programs.

From the perspective of existing **literature**, the method expands the literature in two aspects: the link between (physical and mental) health and quality of life, and the positive link between the Feldenkrais method and quality of life. This conclusion has two aspects as well: exploring the link between posture and quality of life was conducted from a very original viewpoint of posture and quality of life. Concerning the innovation of this conclusion, the MAP method is a new method explored here for the first time in relation to quality of life.

IV.2 Conclusions Regarding Improving Posture

The findings showed a significant improvement in the participants' posture in both groups. Thus, the **factual conclusion** is that posture can be improved by participating in the educational posture improvement programs of the research: Feldenkrais and MAP.

The importance of this conclusion is that it corroborates existing literature regarding the connection between physical activity and improvement of posture, and the connection between exercise according to the Feldenkrais method and improvement in quality of life. It also expands the accumulating knowledge base regarding Feldenkrais as a method that also improves physical measures by means of exercise or using gentle and pleasant movement techniques. The innovations from the present conclusion are that for the first time proof has been found of a connection between a certain amount of exercise according to a familiar method – Feldenkrais - and exercising with a novel method – MAP and improvement of posture. The significance is that by relating to the body as one whole unit (and not just to the back or the legs separately, as is the norm), and by relating to the nervous system (and not only the muscular system, as is the norm), posture can be improved.

IV.3 The Correlation between Improving Posture and Improving Quality of Life

The starting point of this hypothesis was that if posture and quality of life significantly improve due to the posture improvement programs, a positive correlation will be found. In fact, this hypothesis was confirmed by analyzing the qualitative findings as expressed in the "Lesson effect" questionnaire, yet was not confirmed by the statistical analysis.

Since the two findings for the same hypothesis differ, the conclusions should be treated with caution, and determine that the findings constitute a developing trend that need further examination. This conclusion maybe added to the existing literature on the importance of posture to quality of life.

IV.4 Conclusions Regarding the Two Research Groups

No differences were found between the two groups in all parameters of quality of life (physical and emotional) that showed improvement in the research. In the posture parameters, however, certain differences were found between the two groups:

Kyphosis Improvement – a very small advantage was found in the Feldenkrais participants.

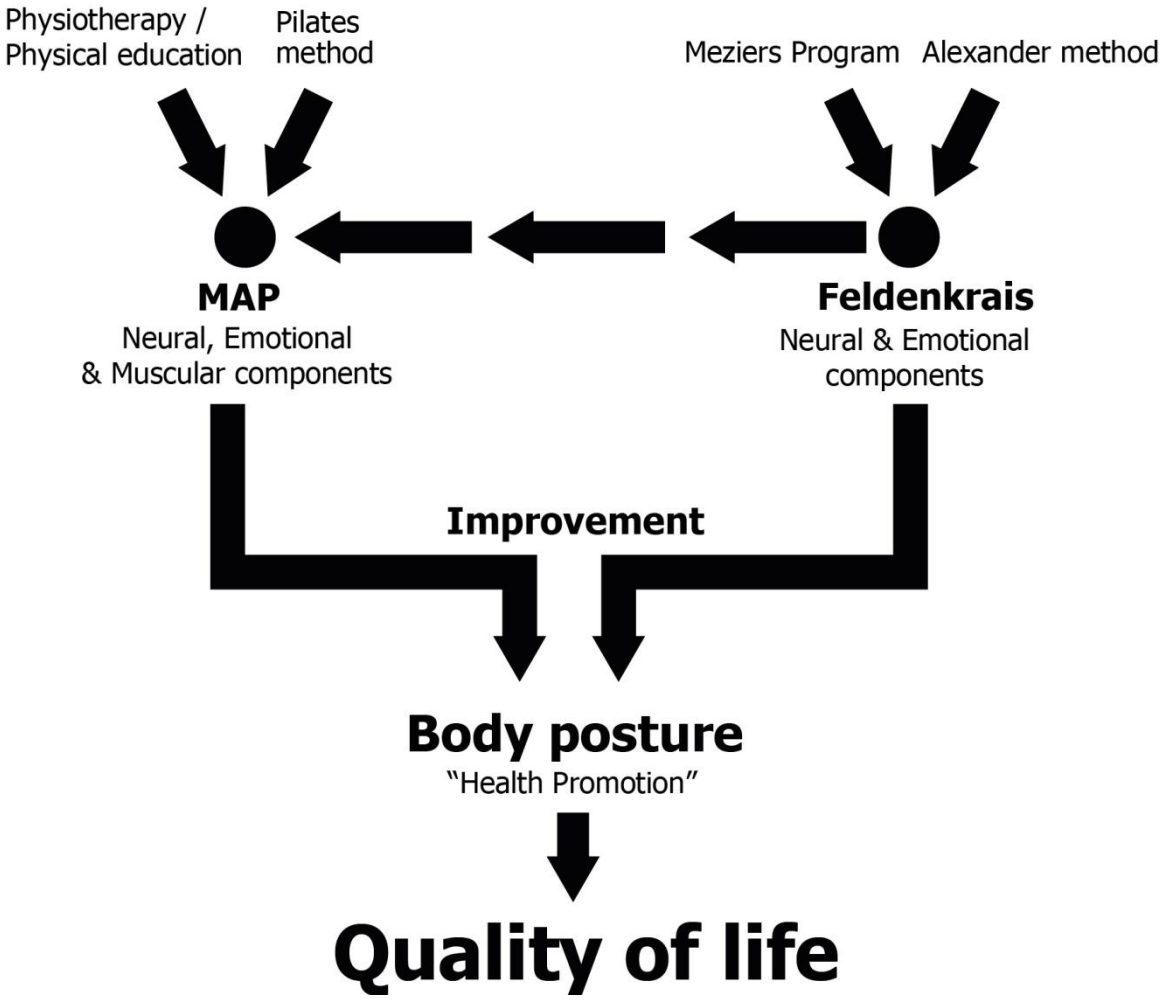
Lordosis Improvement – twice the advantage was found in participants from the MAP method.

This trend showing an advantage to the MAP group is reinforced as a result of the findings from height measurements taken. These findings indicate that MAP participants became taller, i.e. spinal curvature was reduced and they stood straighter than the Feldenkrais participants. Despite these advantages of the MAP method, it is important not to "forget" the findings of Kyphosis improvement, the absence of differences between the two groups on the other parameters and the primary aspect of the MAP method. Thus these MAP advantages must be considered with caution.

To summarize the conclusions – all participants showed an improvement in posture and quality of life. No correlation was found between posture improvement and improvement in quality of life according to the quantitative measures, but effect was found between them according to the qualitative measures, so research should be continued regarding this connection. The MAP method has a certain advantage over Feldenkrais that shows a certain trend. It is too soon to establish categorically that a combination of strengthening the posture muscles (stomach, pelvis and back) in the Feldenkrais method is

the solution to posture impairment, but the new method should continue to be developed and researched.

Figure 6: The Theoretical Model of the Research



The innovation in this study is the presenting of the importance of posture for quality of life. This research is a new construct for understanding quality of life as a synergy between emotional and physical aspects that draws on posture improvement through a pedagogical physical activity program incorporating Feldenkrais and MAP.

IV.5 Recommendations

IV.5.1 General Applicable Recommendations

1. Encourage the general public to acknowledge the importance of moderated physical activity for improving quality of life and preventing posture impairments.

2. The Feldenkrais method and the MAP program should be further examined for implementation in other populations: younger or older populations, more intellectual normative populations and populations with special needs, both intellectual and emotional.

3. The programs should be recommended for several public bodies: the health system, the education system and the business sector.

IV.5.2 Recommendations for Further Research

1. Is there a connection between emotional situations or certain personality traits and posture, and if so, what is it?

2. Can posture also be improved with the help of the Feldenkrais and MAP methods in dynamic and changing situations, such as walking?

3. Can learning ability be improved using the Feldenkrais and MAP methods?

4. Do any other quality of life and posture improvement programs use movement? Can more be created?

5. What is the connection between the Feldenkrais and MAP methods and additional physical measurements, such as balance?

6. What is the connection between the Feldenkrais and MAP methods and additional emotional measurements, such as self-esteem?

IV.6 Research Contribution

1. The contribution of the research **topic** to knowledge:

Considering the human body posture as a meaningful component in a person's quality of life is innovative and places posture in a new light as a subject to be considered in everyday life, in treatment and in research.

2. The contribution of the **theoretical** part to knowledge:

The MAP theory is new and was created in preparation for this research.

It is constructed in a way that combines both the concepts accepted nowadays that relate to coping with the subject of posture: the Feldenkrais method as one founded mainly on neural components as the posture-related components, and the physical education and physiotherapy method, based mainly on strengthening the relevant posture muscles and making them more flexible.

3. The contribution of the **participating** population to knowledge:

There is an absence of studies on the effect of physical activity on the posture of individuals in normal young populations (Kloubec, 2010). This research was conducted among a completely normative population from the health aspect.

4. The contribution of the **study design** to knowledge:

4.1 As far as we know, this is the first time the Feldenkrais method has been researched using the mixed method.

Mixed methods enable synchronization between the measurable "dry" quantitative data and the emotional and sensory data as seen in the qualitative tools.

4.2 The research design was enriched by a new research instrument - the "Lesson effect" questionnaire. This questionnaire was seemingly simple and composed of only five short, clear and focused questions, yet it included all the effect possibilities of the program on the participants. On the one hand it enabled the participants to write anything relevant to changes and sensations they felt that related to participation in the program. On the other hand, it directed the participants to focus on processes they underwent in the research *("What did you feel at the end of class?", "How long did you feel the improvement?"* etc.) and expanding sensory expressions that accompanied every stage of the process.

4.3 It seems that quality of life and posture, and similarly the Feldenkrais method, have not been examined before in such a rich triangulation which included: multiple theories, multiple methods, multiple examination times and multiple research instruments.

5. The contribution of the **research findings** to the theoretical knowledge:

The positive results of the research in the aspects of improvement in quality of life and posture improvement emphasis the importance of the body and its health in the components that make up quality of life.

6. The **practical** contribution to knowledge:

6.1 The world of knowledge and treatment was enriched with an innovative treatment program, the MAP program, and the advantages and uniqueness of the Feldenkrais method as a practical method for quality of life and posture improvement were clarified.

6.2 Awareness of the fact that posture improvement depends mainly on our body and not on expensive external ergometric instruments enables us to adopt a better, more optimistic and easier means to cope with the posture and body.

7. The contribution of the **research findings** to universal development:

This research offers original views on the connection between body posture and quality of life: whether a direct link exists between posture and our everyday functioning, our sensations about the body, emotions, self-esteem and self-confidence. The research enriches the existing knowledge base about posture: how it develops, what is the correct posture, why it is disrupted, what is the process by which most people lose the correct posture, and what are the existing tools and methods to cope with the subject?!.

The research offers a new perspective on how to cope with posture problems: treating not only the muscular system as the main posture improvement mechanism, but also the neural system. Thus the research also suggests a change in policy: to perform not only strengthening exercises to improve flexibility, but also gentle and pleasant movement processes in a relaxed atmosphere that invoke thinking and focusing on sensations. The body should be treated not by its separate parts – back, shoulders, legs and more – but as one whole unit.

Conclusion of the Research

This research places the focus of attention on the importance of posture for quality of life. Although proof of a definite connection between posture improvements is not yet conclusive, this research does provide practical tools for the general public and for professionals to improve their posture in gentle ways that are relatively easy to apply.

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Appendix 1: The Quality of life Questionnaire

SrS-22r† Patient Questionnaire
Patient Name:_____
Date of Birth: _____
Mo Day Year: _____
Today's Date: _____
Age: _____
Medical Record #: _____

Instructions: We are carefully evaluating the condition of your back, and it is IMPORTANT THAT YOU ANSWER EACH OF THESE QUESTIONS YOURSELF. PLEASE CIRCLE THE ONE BEST ANSWER TO EACH QUESTION.

1. Which of the following best describes the amount of pain you have experienced during the past 6 months?
None, Mild, Moderate, Moderate to severe, Severe
2. Which one of the following best describes the amount of pain you have experienced over the last month?
None, Mild, Moderate, Moderate to severe, Severe
3. During the past 6 months, have you been a very nervous person?
None of the time, A little of the time, Some of the time, Most of the time, All of the time
4. If you had to spend the rest of your life with your back as it right now, how would you feel about it?
Very happy, Somewhat happy, Neither happy nor unhappy, Somewhat unhappy, Very unhappy.
5. What is your current level of activity?
Bedridden, Primarily no activity, Light labor, such as household chores Moderate manual labor and moderate sports, such as walking and biking , Full activities without restriction
6. How do you look in clothes?
Very good, Good, Fair, Bad, Very bad
7. In the past 6 months, have you felt so down in the dumps that nothing could cheer you up?
Very often, Often, Sometimes, Rarely, Never
8. Do you experience back pain when at rest?
Very often, Often, Sometimes, Rarely, Never
9. What is your current level of work/school activity?
100% normal, 75% normal , 50% normal , 25% normal , 0% normal
10. Which of the following best describes the appearance of your trunk, defined as the human body expect for the head end extremities?
Very good, Good, Fair, Poor, Very Poor
11. Which one of the following best describes your medication usage for your back?
None, Non-narcotics weekly or less (e.g., aspirin, Tylenol, Ibuprofen) Non-narcotics daily, Narcotics daily, Other: Medication Usage (weekly or less or daily)
12. Does your back limit your ability to do things around the house?
Never, Sometimes, Often, Very often
13. Have you felt calm and peaceful during the last six months?

All of the time, Most of the time, Some of the time, A little of the time, None of the time

14. Do you feel that your condition affects your personal relationships?
None, Slightly, Mildly, Moderately, Severely

15. Are you and/or your family experiencing financial difficulties because of your back?
Severely, Moderately, Mildly, Slightly, None

16. In the past six months, have you felt down hearted and blue?
Never, Rarely, Sometimes, Often, Very Often

17. In the past three months, have you taken any sick days from work/school due to back pain and, if so, how many?
0, 1, 2, 3, 4, or more

18. Does your back condition limit your going out with friends/family?
Never, Rarely, Sometimes, Often, Very often

19. Do you feel attractive with your current back condition?
Yes, very, Yes, somewhat, Neither attractive nor unattractive, No, not very much, No, not at all

20. Have you been a happy person during the past six months?
None of the time, A little of the time, Some of the time, Most of the time, All of the time

21. Are you satisfied with the results of your back management?
Very satisfied, Satisfied, Neither satisfied nor dissatisfied Unsatisfied, Very unsatisfied

22. Would you have the same management again if you had the same condition?
Definitely yes, Probably yes, Not sure, Probably not, Definitely not

Thank you for completing this questionnaire. Please comment if you wish.
Refined 1/1/04

Appendix 2: Examples of data collection research tools

An Answering Example to the "Lesson effect" Questionnaire
Date: 19.6.2012.
Class number: 13
Class name: correct walk

1. What were your emotions at the end of the class?
I had a light sense of lightness, I'm walking out from the class as I came, same clothes, bag and shoes, yet with a feeling I'm a lighter.

2. When did those feeling fade and you felt 'back to normal'?
The strongest feeling was during walking, I walked 30 minutes to my house and it felt very strongly. As I sat I kept on feeling it yet with reduced intensity.
Energetically speaking I'm always calmer 3-4 hours after the class.

3.Did you learn or experienced anything new in the class?
Yes, to walk and stand right. The exercising contributed greatly – especially with the parquet.

4. What did you 'take' from the class to your everyday life?
Knowledge on how to act properly in all relating to walking/standing and correct walking. I felt that in this case I may be able to do it. I'm saying so in continuance to the correct sitting class – in that class I realized that it is a difficult task and during the period after the class when I sat in classes it was not easy to apply.

5. Do you feel a cumulative effect of the classes on your everyday life? If so, please share its expression:
As I mentioned above, the awareness is the most serious part. Now I know how easy it is to maintain correct posture and other effects. In addition, I know how to deal with it, what is right to do while standing/sitting and I try to implement it in everyday life.

Appendix 3: The Summary of the Qualitative Findings of the Study

Category Number	Category name	Number of statements in the category	The general intensity of the category	The man content of the category	Frequency of the main content	Main contents' intensity
Theme 1	The beneficial effects of the single class					
1	The physical expression of the change or improvement	63	Very high	Posture improvement	53	High
2	The main sensation in posture improvement	25	Mediocre	uprightness	7	Mediocre/low
3	The type of change	63	Mediocre	Holistic and specific changes	Holistic – 12 Specific - 12	Mediocre
4	The center learning or experience of the class	40	Very high	Posture awareness	39	Very high
5	Positive feelings fading time	36		A few hours	12	Mediocre
6	The event that brought the fading of the change	7		Back to sitting	7	Very high
7	Increasing awareness and distinction capability	53	Mediocre	Accurate distinction capability	21	High/Mediocre
Theme 2	The effects of all educational programs for posture improvements					
1	The general beneficial effects	101	Very high	Posture improvement and an increase in physical activity and motility	83	Very high
2	Changes in everyday static functions	22	High	Sitting improvement	12	High/Mediocre
3	Changes in everyday dynamic functions	20	High	Maintaining fitness	10	High/Mediocre
Theme 3	Improving quality of life as a cumulative effect of posture improvement					
1	Movement improvement as a component for quality of life improvement	29	Very high	Walking movement	14	High
2	Thought improvement as a component for quality of life improvement	42	Very high	For everyday functioning and posture improvement	Everyday function – 12 Posture improvement – 10	Very high
3	Feeling improvement as a component for quality of life improvement	5	Very low	"feeling good"	3	Very low
4	Sensation improvement as a component for quality of life improvement	18	High	Both physical and mental	13	Mediocre/low