

## **Introduction to the Clinical Study into the Effectiveness of the Matrix Therapy**

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### **A supervised independent clinical study with 418 patients with follow-up for at least one year after the matrix therapy**

For many years the clinical application of cell-biologically orientated matrix therapy has seen significant results.

After an extensive two and a half year independent study into the effectiveness of matrix therapy conducted by TÜV SÜD on behalf of [DAK Gesundheit](#) \*(one of the largest public health insurance companies in Germany with more than 14 million members), matrix therapy was accepted into the health insurance program.

The aim of this study comprising of 418 patients was to evaluate the efficacy of matrix therapy within the context of an integrated contract with the [Klausenbach Rehabilitation Centre](#) in Nordrach (Black Forest) Germany.

### **Health insurer independently conducted the study to assess effectiveness of matrix therapy**

The rehabilitation treatment was performed by specially trained and certified therapists, following specific medical orthopaedic interventions.

### **The criteria for participation in this study were patients with chronic pain where all previous therapies had failed**

The patients in the study presented with back pain, neck pain, shoulder pain and tendon disorders. Almost all patients had previously received pharmaceutical therapy and surgery.

All other forms of physical therapy were unsuccessful, in order for the patients to have qualified for this study.

### **Long-term follow up after one year showed stable results**

The patients were clinically observed for up to one year after treatment with matrix therapy cell biological regulation therapy. The treatment was standardised into six sessions per patient.

The treatment was well received and without adverse effects. No patient refused the treatment or discontinued with the therapy on the basis of adverse reactions or pain.

\* DAK-Gesundheit replaced the original BKK Gesundheit mentioned in the study when the business merged on January 1<sup>st</sup> 2012

### **Long term benefits of matrix therapy**

The majority of patients still showed a significant improvement in mobility and significant pain reduction six months to one year after treatment.

### **The majority of the patients were able to discontinue their pain medication following the matrix therapy**

Medication (specifically painkillers) was significantly reduced within the treated groups.

The average pain score, measured on a scale of 1-10, was reduced from an average of 5.91 for female patients to 2.85 after the treatment. Male participants showed similar effects (reduction from 5.85 to 3.02 after five treatment sessions).

### **Incapacity for work (number of working days lost due to their condition) was significantly reduced in the study group**

Incapacity for work time was also significantly reduced within this treatment group.

The vast majority of patients described the treatment as pleasant. Patients also confirmed themselves that their condition had improved.

[Link to a PDF copy of the clinical study](#) - Original text in German

# Matrix Therapy - Results of a Therapy Study

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## Introduction

Complaints related to the musculoskeletal system are the most common cause of incapacity and sick leave days in Germany<sup>1</sup>. Therapeutic approaches range from medicinal and physical therapies to forms of therapy such as acupuncture.

The matrix therapy is a relatively unknown form of treatment. The basis of the therapy is the improvement of the cell biological regulation.

Although there are some success stories from the practice of this therapy and a single study with a small numbers of participants, until now, there was no statistically proven evidence of its effectiveness.

The aim of this therapy study, which was commissioned by BKK Gesundheit in 2009/2010 at TÜV SÜD Life Service\*, was to create a data base of the previous experiences in regards to its effectiveness.

The focus was also on the criteria of side effects, possible impacts on the incapacity for work and the long-term sustainability of the matrix therapy.

It should be explicitly pointed out that this is a practice-oriented evaluation of the collected data.

Note: For readability, the term patient has been used consistently herein, meaning both persons of male and female gender.

\* independent testing house - leading international expert in providing testing, product certification, qualification, training and knowledge services

<sup>1</sup> Quelle: BKK Gesundheitsreport 2010

## Theory and methodology

### Background and history of matrix therapy

The development of matrix therapy can only be compiled from literature research and oral information. In physiotherapy today, identical approaches are found under the terms of biomechanical stimulation (BMS), rhythmic neuro-muscular stimulation (RNA) or matrix rhythm therapy. The underlying theories and the practical implementation show considerable similarities.

The origin of the matrix therapy and its related methods lies in the practical findings of the Viennese neuropsychologist Hubert Rohracher<sup>2</sup>. His work involving musculature vibrations from 1940 to 1950 represent the physiological basis for matrix therapy.

Rohracher postulated that the continuous ongoing rhythmic activity of the musculature informs the central nervous system about, for example the position of the limb within the room (body perception).

In addition, it is mainly responsible for the formation of heat within the body (body temperature 37 °C). He also suggested that microvibration is likely to play an important role in the microcirculation within the extracellular matrix (ECM).

In the 1960s, reports by Prof. W. Biermann (Sporthochschule Leipzig) can be found in literature on experiments: "Influence of cycloidal vibrations on the human organism"<sup>3</sup>. Herein, special frequency and amplitude windows were revealed, which were perceived as being particularly health enhancing.

The findings, which form the basis of this special cell biological vibration therapy, are reflected within the works of the Viennese school from Alfred Pischinger<sup>4</sup> to Hartmut Heine<sup>5</sup>.

Furthermore, the biophysical relationships between muscular rhythm, microcirculation and cell metabolism of all living organisms are considered.

Within the former GDR (East Germany), later also within the former Soviet Union, the first therapy devices were manufactured according to these specific findings and were used in high-performance sports for the stretching and regeneration of elite athletes.

According to the current state of knowledge, Prof. V. Nazarov<sup>6</sup> and the company Skomed Medical Devices were the leaders in this therapeutic direction within the former USSR.

It was the German sports scientist and high-performance athlete Siegfried Hoffmann<sup>7</sup>, from Landau who brought Prof. V. Nazarov and his corresponding equipment to Germany after the collapse of the USSR.

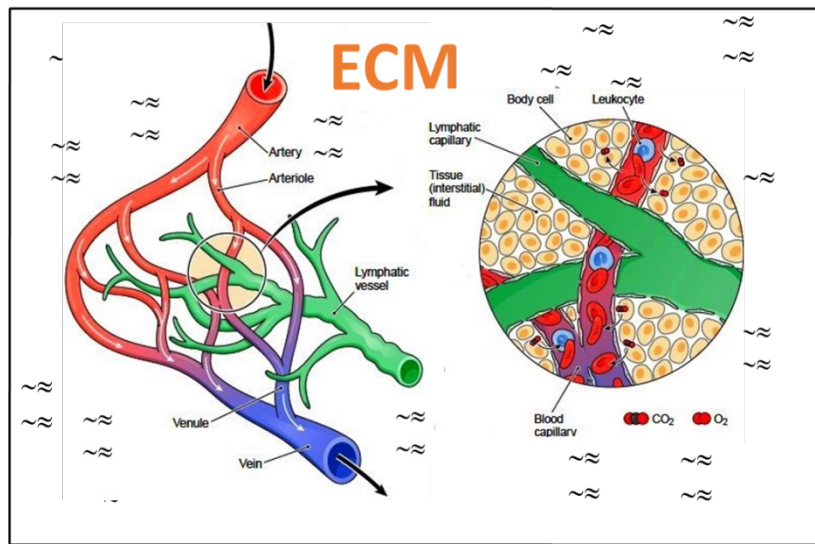
Hoffmann built more modern versions and extended the theoretical foundations towards a therapy of musculoskeletal disorders.

Due to the astounding success, an increasing number of people engaged with this therapeutic approach. This led to a large number of device manufacturers and to an increasing spread of "vibrational devices". Nowadays, fundamental knowledge is required in order to be able to differentiate physiologically effective therapy devices from unspecific vibration methods.

Regardless of the manufacturer, all therapy devices that couple the longitudinal vibration within the musculature are suitable. For this purpose, a frequency window of 8Hz to max. 30Hz and an amplitude window of about 1mm to about 5mm is required.

- 2 Rohracher, Hubert & Inanaga, K.: *Die Mikrovibration*, 1969, Bern, Huber
- 3 Biermann, W.: *Influence of cycloid vibration massage on trunk flexion*, American Journal of Physical Medicine. 39: 219–224, 1960
- 4 Pischinger, Alfred.: *Das System der Grundregulation* (1975), Neubearbeitung Hartmut Heine, 2004, Haug
- 5 Heine, Hartmut: *Lehrbuch der biologischen Medizin, Grundregulation und Extrazelluläre Matrix*, 1991, Hippokrates
- 6 Nazarov, Vladimir: *Optimierung des Menschen*, Selbstverlag, 1996
- 7 Hoffmann, S.: Torsten Wendlandt, *Fitness für Faule*, 28.10.2010, [www.gesund-magazin.de/artikel/vibrationstrainer](http://www.gesund-magazin.de/artikel/vibrationstrainer)

## Physiological basics (therapy concept)



ECM: extracellular matrix

*Figure 1: The extracellular matrix*

Every cell within the body is surrounded by the so-called extracellular matrix (ECM). The cell feeds on this matrix (matrix = mother or nurse) and at the same time releases metabolism end-products into it. The necessary substances for cell nourishment, such as oxygen and nutrients, are delivered via the arterial capillary into the ECM and must diffuse to the cell. The lymphatic and venous system permanently purify the fluid within this extracellular matrix.

The circulation of the fluid within the extracellular matrix is primarily the responsibility of the musculature. In a healthy and relaxed state, all muscles show an orderly rhythmical micro-movement of between 8-12 Hz, invisible to the naked eye. These "micro vibrations" are caused by ongoing muscle contractions at rest and are increased under physical stress. They act like a pump upon the fluid that surrounds each bodily cell, as they repeatedly squeeze venous and lymphatic capillaries. They promote the venous and lymphatic outflow from the intercellular space towards the heart. In this way, the metabolic end-products are transported away and the cells can be re-fed with important nutrients.

Disturbances within this smallest community (= arterial capillary, extracellular matrix, cell, lymphatic and venous drainage system) through a rhythm derailment of the muscles lead to local "toxification" and hyperacidity. The consequence is, among other things, an increasing irritation of the pain sensors embedded within the cell environment and thus the development of "non-specific" pain.

Matrix therapy is cell biological regulation in the sense of process optimization (rhythm, circulation and metabolism) at the cellular level. This forms the basis for the longer-term elimination of musculoskeletal complaints. Warmth, exercise and nutrition permanently ensure the positive effect of matrix therapy. Accordingly, a holistic approach to personal health should follow any matrix therapy.

## ZRT Extracellular matrix

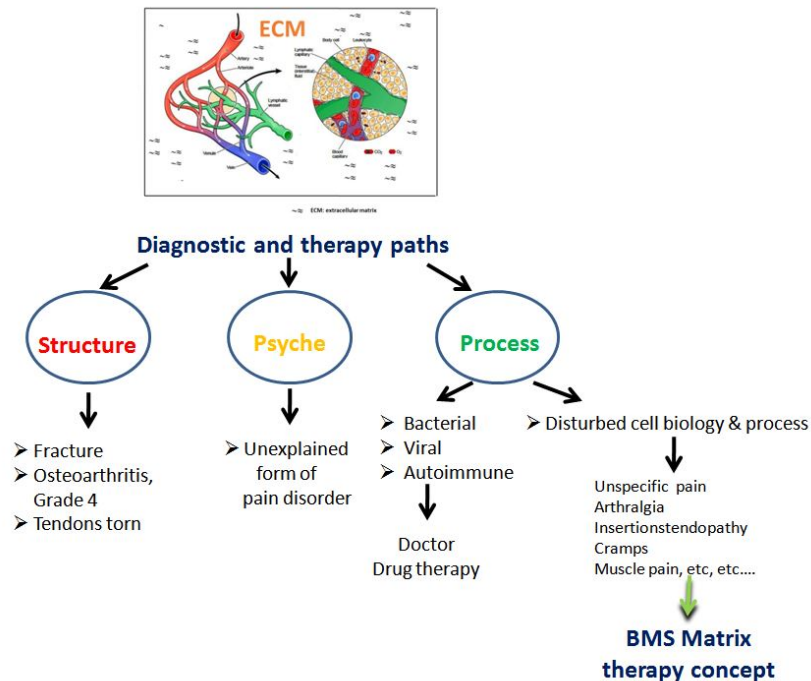


Figure 2: Model of diagnostics and therapy pathways (ZRT = Cell Biological Regulation Therapy)

According to the model of diagnostics and therapy pathways, the complaints are assigned to the respective leading diagnostic and therapeutic pathways (see Figure 2). If it is a process disorder, therefore, a de-compensated cell biological process, which is for e.g. presents itself as non-specific back pain or cramps, matrix therapy is the "therapy of choice."

If the matrix therapy does not bring the desired success, in other words, a significant relief of the symptoms, as the circumstances require - a renewed assessment, examination and classification of the complaint on the basis of the diagnostic and therapy pathways is necessary.

## Treatment goal

In summary, the therapy goal is the normalization of the muscular rhythm and microcirculation within the cell-milieu system (ECM) as well as the improvement of the cell metabolism as a result from the physiological basics and the therapy concept.

In matrix therapy, the rhythmic micro-movement of the muscles is mimicked by an external stimulation. An oscillator stimulates the natural physiological vibrations of the skeletal muscle. Pulse waves are transmitted through the muscles into the environment surrounding the cells. The circulation and purification of the cell environment are thus re-started. This eliminates the disturbances within the cell metabolism as well as the accumulation of metabolic and acidic residues and induces a lessening of the pain and discomfort.





*Figure 3: Use of the oscillating applicator to the back (Image: B. Dickreiter)*

## Indications

Extract of typical indications for matrix therapy

- Musculoskeletal complaints such as unspecific back problems
- Muscle hardening
- Degenerative spinal disorders, e.g. as a result of disc damage
- Disc damage
- Heel spur
- Tennis elbow
- Carpal tunnel syndrome

Further proven indications are:

- Insertion endopathies
- Frozen shoulder
- Arthralgias of unknown origin
- Postoperative muscular complaints
- Sudeck's disease (CRPS)
- Wound healing disorders
- Fibromyalgia
- Scar symptoms

## Study design

This study was based on the consensus view of the commissioned health insurance fund and the experts in the field of matrix therapy, that a manufacturer-independent therapy concept, a standardized training concept and standardized outcome controls were necessary to obtain meaningful results in terms of efficacy achieved with matrix therapy.

The therapy concept has already been presented in the previous section. The training concept and the realization of the results will be described below.

## Training concept

In principle, only physicians were eligible contractors (usually general practitioners, specialists in general medicine, internal medicine specialists, orthopaedic surgeons and surgeons) and physiotherapists. The training/education and instruction of the matrix therapy was carried out by a recognized training centre (for example Rehabilitation Clinic Klausenbach).

Doctors and physiotherapists all completed a one-day basic seminar there. Physiotherapists then followed up on the practical application of the matrix therapy as well as a user seminar within 3 months of the basic seminar. For physicians and physiotherapists regular further education was mandatory.

## Methodology (Keyword Result Control)

As already mentioned in the introduction, this was explicitly a practice-oriented study. Some criteria of a scientific study design were deliberately not taken into consideration. In order to make general statements, various statistical test procedures would have to be applied, all based on strict model assumptions. Accordingly, no statistical correlations were calculated for this study or general hypotheses tested, but only the data collected described (= descriptive statistics).

As part of a pilot project commissioned by BKK Gesundheit, 418 people underwent matrix therapy and a variety of data was collected from these patients.

The database of the study consisted of several questionnaires and repeated follow-ups by telephone calls to patients over a period of 12 months. At the start, there was the Therapy Regulation/Agreement (see Annex 4 of the Integrated Care Matrix Treatment Agreement). In addition, each patient completed a questionnaire in regards to their health situation and previous history (see Annex 6). During the therapy (regular treatment: 6 units of approx. 30 min each), a questionnaire on pain levels (see Appendix 7) was filled in at the physiotherapist's. 3, 6 and 12 months after the end of treatment, a standardized telephone survey was conducted.

This study was a so-called panel design. There was a repeated measurement of the variable values for the same persons. This was realized by telephonic follow-up on pain values and incapacity for work at three different times.

The problem with this form of study design is the shrinkage rate (= panel mortality). Not all patients could be interviewed again at the scheduled time intervals. There were several reasons for this. For example, the survey was denied or the patients were unattainable. The shrinkage rate is thus defined by the three times unavailability. The following shrinkage rates can be observed:

- after 3 months: 37.71%
- after 6 months: 36.74%
- after 12 months: 35.52%

Initially, 3 telephone surveys per patient were planned. However, due to the relatively high rate of shrinkage, the survey efforts were intensified, which led to a reduction in the shrinkage rate over time.

### *Example of a patient*

Ms. M. has been suffering from strong tension in the shoulder and neck area for about 3 months. She has been unable to work for a week due to these complaints. After physiotherapy and self-medication, she visited her GP again who prescribed Ms. M. 6 units of matrix therapy and agreed with her to partake in exercise therapy for half an hour at least three times a week. With the completed questionnaire regarding the health situation and history, Ms. M. is looking for an accredited physiotherapist. Her previous health history is inconspicuous. Before the first and any further treatment by the physiotherapist, he asks her what her current pain value is on a scale from 0 = no pain) to 10 (= unbearable pain). At the beginning of the treatment, Ms. M. gives a value of 8, before the 2nd and 3rd treatment a value of 5, before the 4th treatment a value of 4 and before the 5th treatment a value of 2. When asked 3 months after the end of treatment, Ms. M. reports a pain score of 3. She no longer takes any medication and has not done any other therapies since the matrix therapy. She was also no longer incapacitated for work since then. She makes similar statements in the other two phone calls after 6 and 12 months, respectively: no incapacity for work, no further therapies and pain values of 3 and 4, respectively, on the 0-10 scale.

## Selection of patients

According to the model of the diagnostic and therapeutic pathways (see Figure 2), the treating physicians select the patients with suspected process disorders in the area of musculoskeletal complaints, inform them about cell-biologically oriented physiotherapy (matrix therapy) and refer them to the participating physiotherapist. In total, the data of 418 patients was recorded and evaluated over a period of approx. 2½years.

## Study results

### Gender

About 2/3 of the patients (64%) on whom matrix therapy was performed were women.

### Age

The most common age group was the 41-50 year olds. They accounted for a good third of the patients. Overall, 75% of patients were older than 40 years.

## Diagnosis

Diagnosis	Number	Quota
Disc prolapsed	16	4%
Joint pain	42	10%
Muscle hardening	151	36%
Neck pain	141	34%
Scar pain	4	1%
Edema	4	1%
Back pain	266	64%
Shoulder and neck tension	228	55%
Tendon problems	18	4%
Other diagnosis	88	21%
Wound healing disorders	1	0%
Condition after disc operation	5	1%

Figure 4: Diagnosis

Back pain (64%) and shoulder/neck tension (55%) were the most common diagnosis. Muscle hardening (39%) and neck pain (34%) were also frequently diagnosed. Overall, the matrix therapy was usually prescribed because of pain and/or tension/muscle hardening in the back, shoulders and neck. It should be noted that in any patient, multiple diagnosis may be applicable at the same time.

### Additional therapy agreements after diagnosis

As already explained, exercise and nutrition also play an important role in ensuring the long-term improvement of cell metabolism. Accordingly, in addition to the prescription of the matrix therapy, further therapy agreements were made between the patient and the prescribing physician. Irrespective of the diagnosis, the most commonly agreed on were "exercise therapy" (from 39% for muscle hardening to 67% for joint pain) or back training (between 19% for shoulder/neck tension and 28% for back pain), changes in dietary habits as well as other weight-loss measures were comparatively rare.

### Additional therapy units

The standard treatment duration comprised of 6 therapy sessions. 67 patients (about 16%) received additional therapy sessions. The most frequent reason for the deviation from the standard treatment duration was a gradual improvement in findings. Additional units should further improve the findings. Often, no reason for further additional treatments was given, or the following reasons were stated: "stabilization of treatment success", "persistent pain symptoms" and "therapy resistance".

Notes: The pain values and incapacity for work after 3, 6 and 12 months were not differentiated according to whether a patient received further therapy units or not. For the sake of comparability, only the values of the standard duration of treatment were taken into account in the development of pain during the course of the therapy.

## Previous therapies

Previous therapy	Number	Quota
(Pain) Pain relief drugs	280	67%
Operation	17	4%
Physical therapy	341	82%
Other therapy	60	14%

*Figure 5: previous therapies before starting matrix therapy*

In the context of the health questionnaire and the agreement, the previously undertaken therapies were recorded for the 12 months prior to the start of the matrix therapy. Multiple answers were possible. 82% of patients had received some form of physical therapy, e.g. remedial exercises or manual therapy. About 67% of the patients had taken medication for the complaints within the 12 months previous to the start of matrix treatment. Whereas only 4% had surgery. 14% stated other therapies, e.g. acupuncture, etc.

## Side effects

For some of the consequences of matrix therapy, the term "side effect" is inappropriate, as the removal of metabolic end products is a desired effect, e.g. the frequent urination after treatment caused in 14% of patients. Also, the fatigue, which 6% stated after the matrix therapy, is a physiological consequence. Of the 5% of patients with "other side effects", headache/pressure in the head was mentioned 6 times, muscle soreness and dizziness 3 times each. Only mentioned once were for example, thirst, migraine and initially severe pain.

## Withdrawals from treatment

Altogether 19 patients (about 5%) discontinued the therapy. The following reasons were mentioned here (in order of frequency): appointments were missed, no improvement in symptoms, hospital stay, complaints during the matrix treatment and increase in pain. In two cases, no indication was given why the therapy was discontinued.

## Incapacity for work before the start of therapy

Figure 6 shows the incapacity for work of the patients due to their complaints in the 12 months prior to the start of therapy.

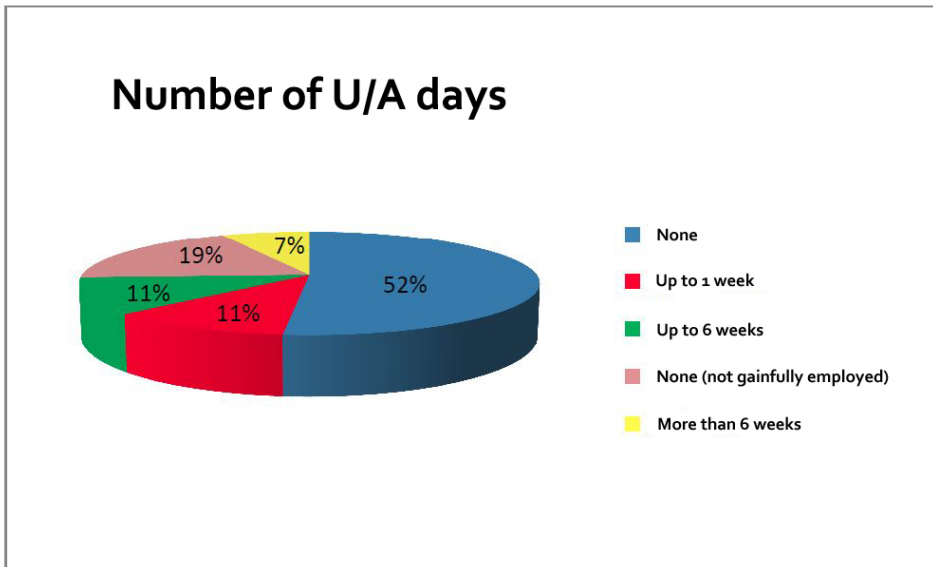


Figure 6: Incapacity before treatment (pro rata)

Nearly 30% of patients were unable to work in the previous year due to their complaints, including approximately 62% for more than one week. 77 patients (= about 19%) of the patients were not gainfully employed. This accounts for 52% of patients who have still continued to work despite their complaints.

## Incapacity for work during the year

One main aim of this study was to make a statement about the change of the incapacity for work (= U/A) of the questioned patients whom received the matrix therapy.

As explained earlier, there was a relatively high rate of fading during the year, which calls for extra caution in the data analysis. To ensure that the same patients are compared, 3 groups were formed, including patients who were interviewed by telephone at 3, 6 and 12 months after the end of treatment. In the 3 groups, the U/A times after the end of the treatment are compared with the U/A times in the 12 months prior to the start of treatment.

*U/A stands for Unavailable – incapacity to work*

### U/A times of patients surveyed after 3 months

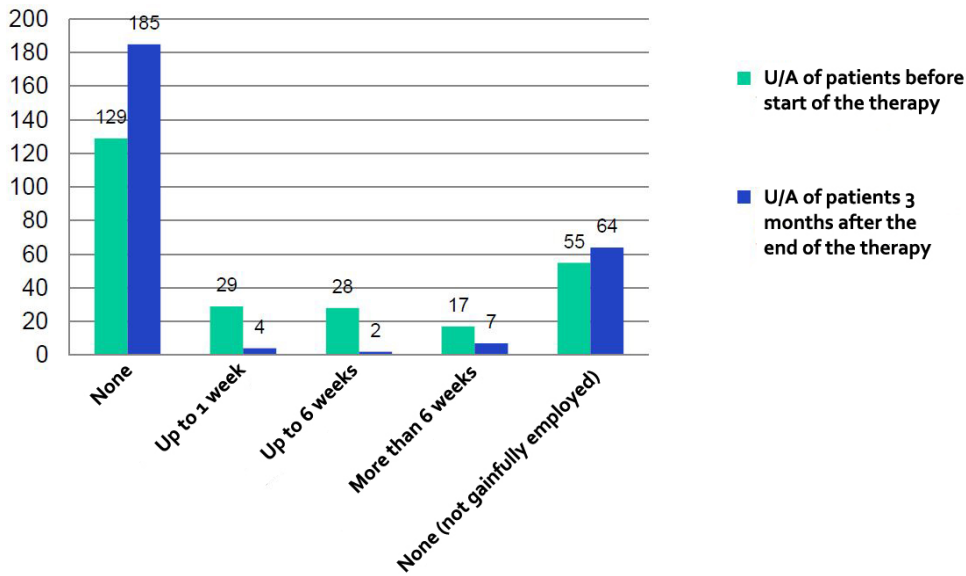


Figure 7: Incapacity or U/A times of patients interviewed after 3 months

Out of the patients who were interviewed 3 months after the end of treatment, 185 patients were no longer incapacitated for work due to their initial complaints. This is 43% more than before the start of therapy.

Out of the 28 patients who were incapacitated for work for up to 6 weeks in the year before the start of therapy, there are only 2 patients 3 months after the end of treatment (about 7%).

In the group of respondents 6 and 12 months after the end of the treatment, the numbers look similar.

### U/A times of patients surveyed after 6 months

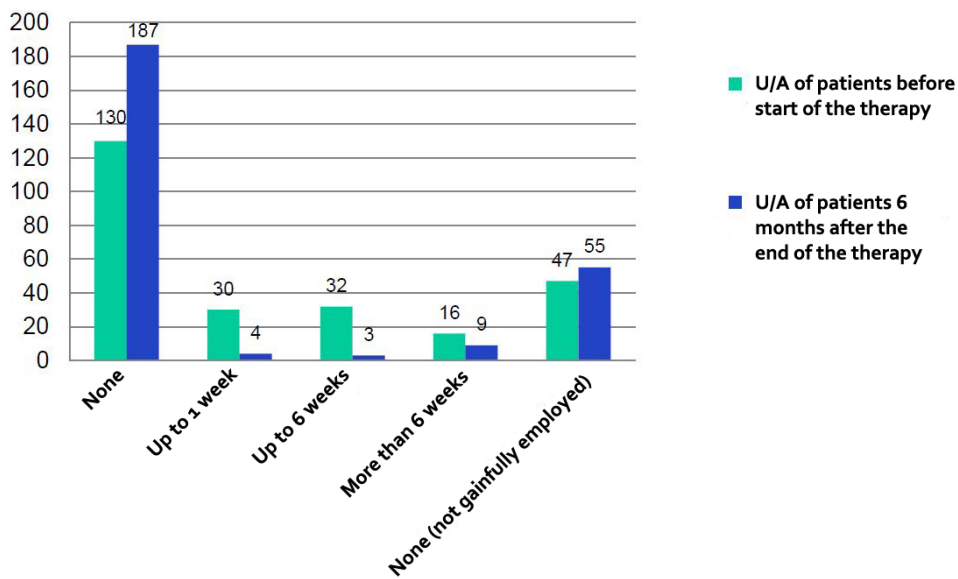


Figure 8: Incapacity or U/A times of patients interviewed after 6 months

Out of the patients who were interviewed 6 months after the end of treatment, 187 patients were no longer incapacitated for work due to the initial complaints. This is 44% more than before the start of therapy.

Out of the 32 patients who were incapacitated for work for up to 6 weeks before the start of treatment, there were only 3 patients 6 months after the end of the treatment (about 9%).

### U/A times of patients interviewed after 12 months

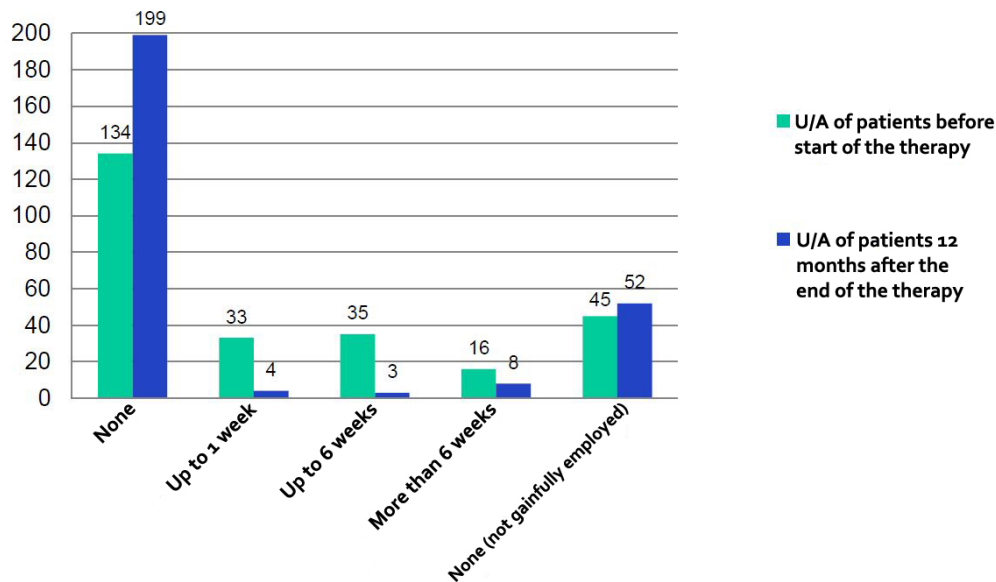


Figure 9: Incapacity or U/A times of the patients interviewed after 12 months

Out of the patients who were interviewed 12 months after the end of treatment, 199 patients were no longer incapacitated for work because of the original complaints. This is almost 49% more than before the start of therapy.

Out of the 35 patients who were incapacitated for work for up to 6 weeks in the year prior to the start of treatment, there were only 3 patients 12 months after the end of the treatment (about 9%).

Looking at the proportion of people in all three groups who were no longer incapacitated for work in comparison to the year before the start of therapy, an increase of 43% 3 months after the end of treatment, over 44% 6 months after the end of treatment and up to 49% 12 months after the end of treatment appears.

Meaning that almost one out of two patients was no longer incapacitated for work one year after completing the matrix therapy. This result could indicate the long-term efficacy of matrix therapy.



## Pain development

The subjective assessment of the pain was made by the patients on the basis of a pain scale.

The scale value 0 = no pain and the value 10 = unbearable pain.

The pain development was documented by a change in the scale points.

The "average improvement" was the difference between the pain value before the onset of therapy and after the fifth therapy session. To determine the pain value after the sixth treatment, the patients would have had to be interviewed a few days after the sixth treatment; this was impossible due to organizational reasons.

Therefore, the value after the fifth treatment serves as a reference value. Here it can be assumed that the results of the therapy would possibly have been even better if this query had been made additionally after the end of the sixth therapy unit.

In some cases there was an improvement or at least a constant level of pain despite the reduction or discontinuation of pain medications during the therapy. Again, the results would probably have been better allowing for these changes; this was impossible due to reasons of objectivity.

A statement in the sense of "the pain has halved" or "the pain has been reduced by 50%" is impossible due to the scale level of the nature of the pain on a scale of 0-10 (ordinal scaled feature). Although a ranking can be formed, no statements can be made about the distances between the individual values. With a pain value of 4, the pain is less than with a pain value of 5.

However, whether the difference between the values 4 and 5 is the same as between the values 8 and 9 is questionable. This becomes clearer in connection with the aforementioned statement "the pain has been halved". It is certainly undisputed that a change in the pain value from 8 to 4 would make a different statement about the therapy than a change in the pain value from 2 to 1. Although the value has been halved in number.

Against this background, the following is merely the average improvement, based on a change in the indicated values on the 0 - 10 pain scale.

## Pain development by gender

Before the start of the therapy, the average pain value of the female patients was approx. 5.91, within the male patients approx. 5.67. The male patients tended to estimate their pain less intense on average. After 5 treatments, the average pain score is about 2.85 for women and 3.02 for men. The average improvement in the course of therapy is almost half a point higher in women (3.05 to 2.65).

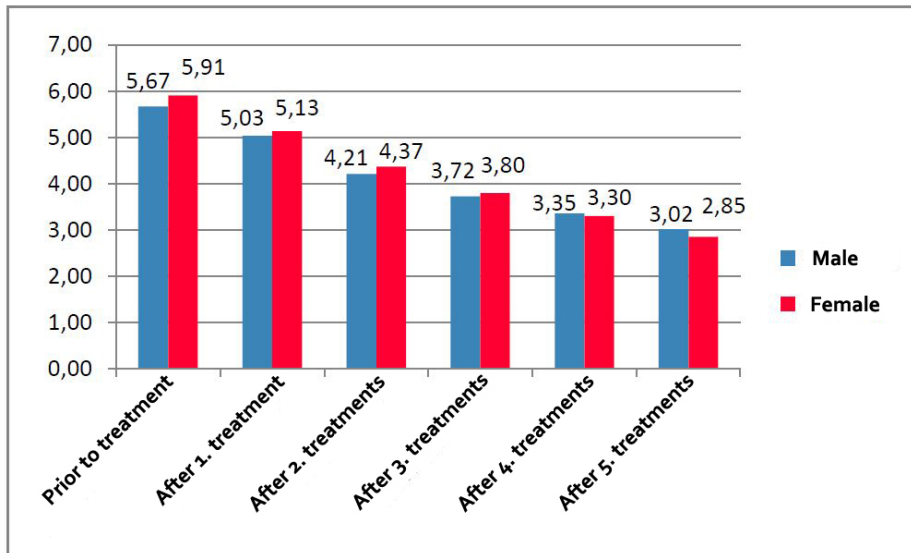


Figure 10: Pain development by gender

## Pain development by age group

The patients were divided into 6 age groups: up to 20 years, 21-30 years, 31-40 years, 41-50 years, 51-60 years and over 60 years. Almost all age groups show a clear improvement. The average improvement in complaints is highest in the group of 51-60 year olds (3.1 scale points), and lowest in the group of under 20 year olds (2.2 scale points).

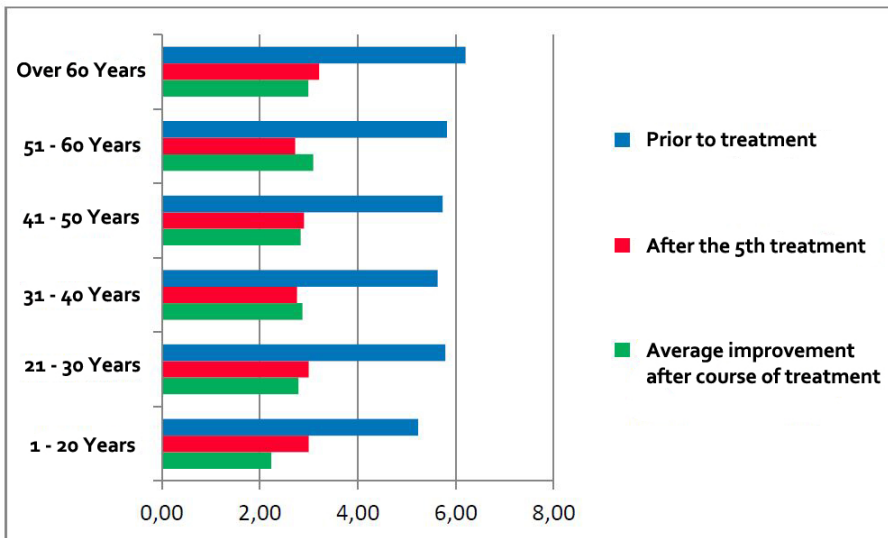


Figure 11: Pain development by age group

## Pain development after previous therapy

For those who had already undergone surgery for their symptoms, the average improvement was the least. It can be assumed that the complaints in patients who had already undergone surgery were more of a structural nature. This could explain why the improvement in discomfort was the least here, although there was an average improvement of 2 points on the pain scale. The improvement in patients who had already taken (pain) medication and/or had physical therapy prior to treatment was almost the same (2.9 points on the pain scale).

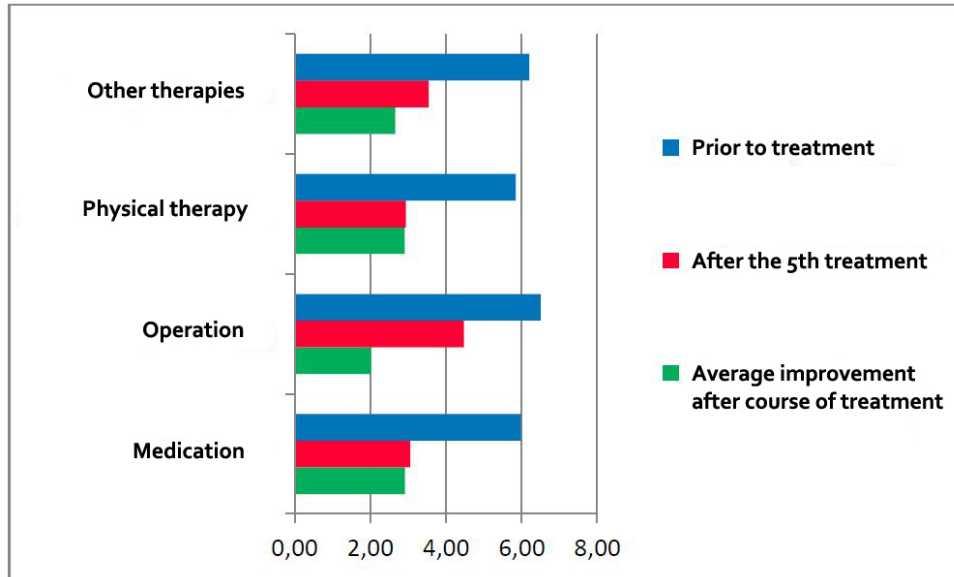


Figure 12: Pain development after previous therapy

## Pain development after diagnosis

The most frequent diagnosis are listed here (greater than 10 individuals) show that pain development was similar in all diagnosis.

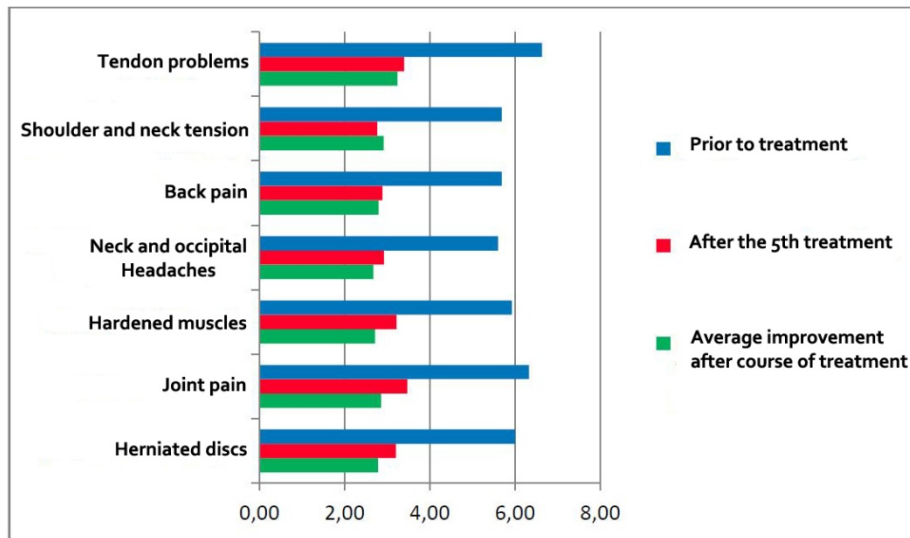


Figure 13: Pain development by diagnosis

## Pain development after incapacity for work

Persons who were unable to work due to their complaints or who were unable to work for up to one week reported the greatest improvement on average (3.1 and 2.9 points on the pain scale, respectively). Among the long-term patients, the improvement was the least (2.5 or 2.6 points on the pain scale).

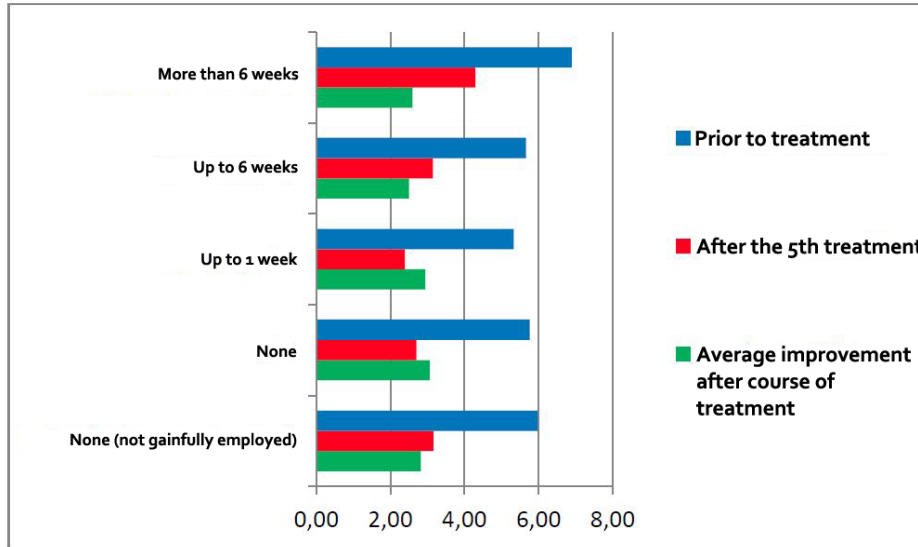


Figure 14: Pain development after pre-existing incapacity for work

## Pain values after the end of the therapy

As previously mentioned, patients were asked about their current level of initial pain, after the course of 5 treatments and at 3, 6 and 12 months after the end of treatment.

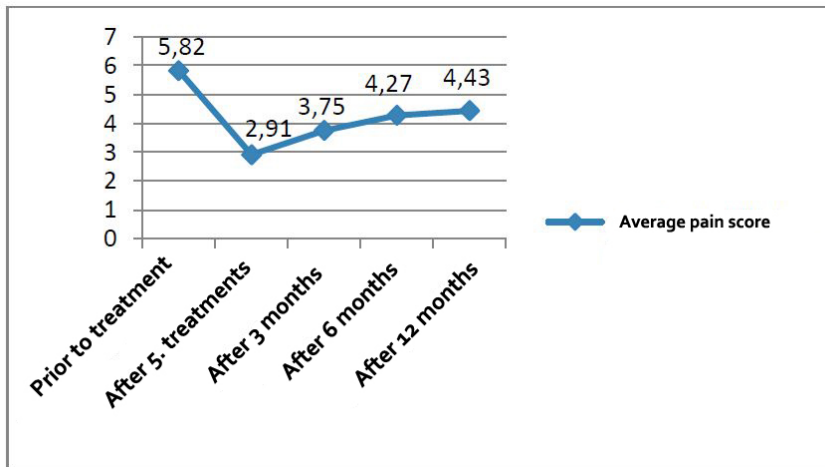


Figure 15: Average pain score values over the course of the year

Immediately after the treatments, there was a significant improvement in pain levels. Although this improvement decreased over the course of the year following the treatment, as can be seen from the increase in the average pain score value, the average pain score value 12 months after the end of treatment was still 1.5 points below the pain value before the start of therapy.

This can be understood as an indication that after a certain period of time a renewed course of matrix therapy might be necessary.

## Pain development during the year

One goal of the study was to investigate the sustainability of matrix therapy. This was realized through the one-year support of the patients. In the following, the pain development of the patients in the course of the first year after the end of treatment is to be represented, in each case the number/proportion of patients according to the degree of improvement or deterioration. This corresponds to the difference in pain value between the start of treatment and the time described.

Note: The case numbers differ depending on the time period considered. For example, the sum of the respondents after 3 months is not equal to the sum of the respondents after 6 months.

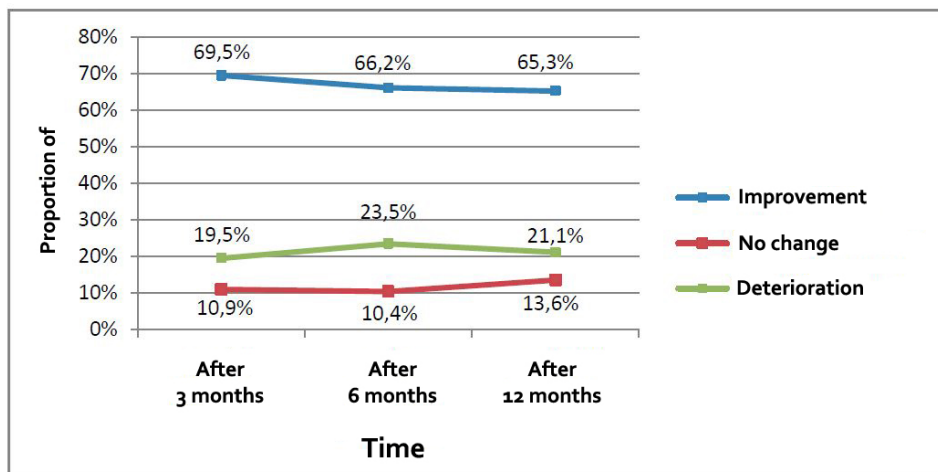


Figure 16: Change in pain development 12 months after the end of treatment

Almost 70% of the patients surveyed felt an improvement of their original pain level even after 3 months. After 12 months, it is still over 65%. The proportions of patients without changes of symptoms or worsening of symptoms changes respectively in the same manner. Whereas the proportion of patients without a change in symptoms initially drops slightly to 6 months after the end of treatment, it increases slightly again after 12 months. The opposite is the case for patients who report worsening of discomfort following matrix therapy. Up to 6 months after therapy, the proportion of patients increases, then at the time of 12 months after the end of the therapy slightly decreases again.



## Therapies 3, 6 and 12 months after the end of therapy

A coefficient that is certainly relevant for the providers of medical treatments, is the need for further curative treatment after the matrix therapy. A tangible cost analysis with regard to drug consumption, treatment costs and incapacity for work is not part of this study. However, the therapies should at least be compared with those 3, 6 and 12 months after the therapy within the year before the start of treatment.

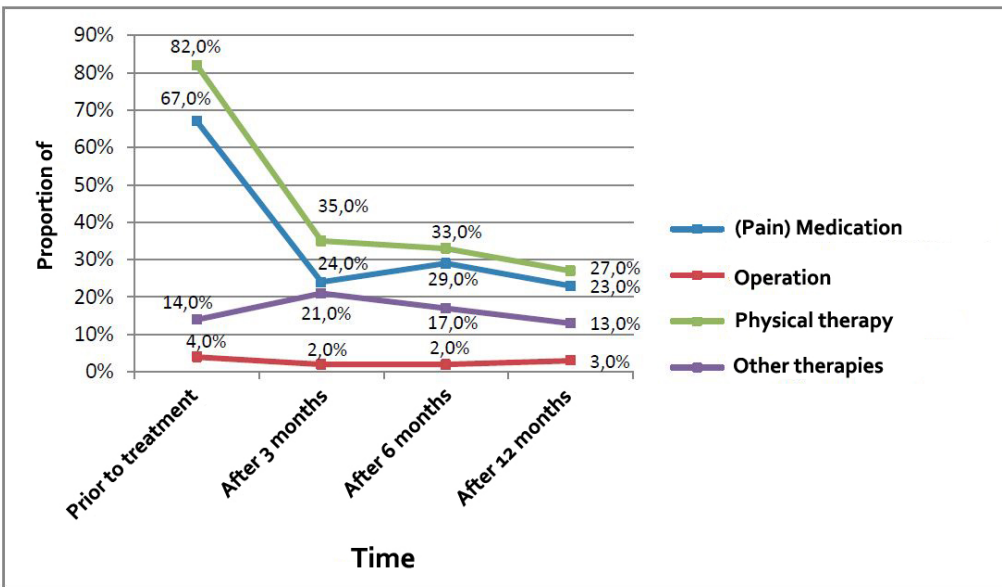


Figure 17: Further therapies before and during the year after the end of matrix therapy

Figure 17 shows a significant decrease in the medical and physical therapy measures required due to the origin of the complaints.

Before the start of therapy, 67% of the patients had taken painkillers. Three months after the end of the therapy, it was 24% and 9 months later only 23%.

A similar effect shows when looking at the frequency of physical therapy received over the year.

## Summary

The aim of this therapy study was to create a solid database for the previous assumptions regarding efficacy.

The focus was also on criteria such as side effects, possible effects on incapacity for work and the sustainability of matrix therapy. These assumptions have mostly been confirmed during the 12 months.

For at least one year after the matrix therapy, a large proportion of patients suffered with less pain, had lower incapacity (U/A) times, and needed less additional therapies.

Nearly two thirds of patients were no longer dependent on medication or physical therapy 1 year after the matrix therapy. In about two thirds of the respondents, a long-term improvement of the complaints could be proven. And nearly half of the patients were not incapacitated for work due to the original complaints up to one year after the treatment.

There were only minor side effects, which makes a broad application of the therapy process possible. Together with the ease of use and the comparatively low costs (€227.00 for the health insurance and €28.00 as a share for the patients), it is possible to use the matrix therapy, inter alia, in established health services, e.g. in the context of occupational health management.

According to the definition of the WHO, physical well-being is only one parameter for the state of "health"<sup>8</sup>. Against this background matrix therapy represents a very important pillar of the holistic therapy concept in addition to warmth, physical exercise and nutrition, even greater therapy successes can be assumed when taking into account these other therapeutic pillars.

It is reasonable to suppose that successful matrix therapy is also associated with a positive impact on mental and social well-being and patient performance.

The matrix therapy is therefore the important "prelude" to further lifestyle changes.

Exercise training, for example, is certainly easier if the patient suffers from significantly less pain. Therefore: An exclusive treatment of the complaints with only the matrix therapy will often not be sufficient to bring about a long lasting improvement of the overall health situation of patients according to consistent experience of the authors.

<sup>8</sup> Gesundheit ist „ein Zustand des vollständigen körperlichen, geistigen und sozialen Wohlergehens und nicht nur das Fehlen von *Krankheit* oder *Gebrechen*.“ Verfassung der Weltgesundheits-organisation (WHO), deutsche Übersetzung; <http://www.admin.ch/ch/d/sr/i8/0.810.1.de.pdf>, 17.04.2011

Based on the individual criteria, various causalities can be assumed between them, but the relationship has not been proven by statistical methods. Here are some hypotheses/assumptions that could be considered in an in-depth study.

- Lower pain results in lower incapacity (U/A) times.

The matrix therapy therefore makes a noticeable contribution to the reduction of incapacity (U/A) times and thus a saving for the employer, the state, health and pension insurances.

- Lower pain leads to lower drug consumption and thereby reduces potential side effects, which may be caused by long-term use of, for example, non-steroidal anti-inflammatory drugs (NSAIDs). This In turn, can lead to cost savings for health insurance and save unnecessary side effects for the patient.
- Experience in practice shows, that lower pain leads to increased performance in everyday life and work.
- The length of incapacity for work depends upon the diagnosis. Many of the diagnosis listed in this study are based on a process disorder in microcirculation and have not (yet) led to a structural change (degenerative changes in bone, cartilage, and joint). Matrix therapy could avoid structural disorders by treating process disorders (e.g., muscle hardening, tension). The matrix therapy could thus be a form of prevention for structural damage of the musculoskeletal system.
- And last but not least: The matrix therapy leads to an increase in quality of life and patient performance.

## Thanks

Such a comprehensive study is unconceivable had it not been for the contribution of many participants for its success. For this reason, the study management would like to thank the following people and institutions:

- Jane Schuhmacher (project assistant and coordinator) and other employees of TÜV SÜD Life Service GmbH
- Dr. Bernhard Dickreiter for his professional support
- BKK Health as the client
- All therapists and patients who participated in this study

## Appendices 4, 6 and 7 of the matrix therapy care contract

Please refer to the original German text

## Photo Credits

Figure 1: The extracellular matrix

Figure 2: Model of diagnostics and therapy pathways (ZRT = Cell Biological Regulation Therapy)

Figure 3: Application of the vibration applicator on the back

Figure 4: Diagnosis

Figure 5: Previous therapies before the start of matrix therapy

Figure 6: Incapacity for work before the start of treatment (pro rata)

Figure 7: AU times of patients interviewed after 3 months

Figure 8: AU times of patients interviewed after 6 months

Figure 9: AU times of patients interviewed after 12 months

Figure 10: Pain development by sex

Figure 11: Pain development by age group

Figure 12: Pain development after previous therapy

Figure 13: Pain development after diagnosis

Figure 14: Pain development after incapacity for work

Figure 15: Pain values during the year

Figure 16: Change in pain development 12 months after the end of therapy

Figure 17: Further therapies before and during the year after the end of matrix therapy