

**"Stays in the "Koblenz Salt Caves with Dead Sea Salt" and their  
impact on circulation, lung function and subjective well-being"**

prepared for

Präventiv Well GmbH

Schloßstr. 40, 56068 Koblenz

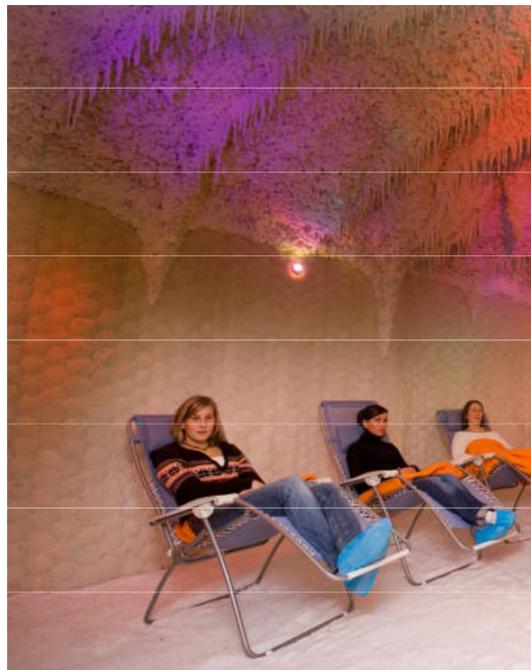
by

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in cooperation with

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## **The Task of Expertise**

Submitted global, unique study of scientists and experts of Prof. Leyk, PhD and Erley, PhD examined the healing effect of "Koblenz Salt Caves with the Dead Sea Salt". The purpose of this major study, involving more than 100 participants, was to determine whether there are objective effects achieved by staying in the "Koblenz Salt Caves with the Dead Sea Salt" and how respondents assess the treatment of symptoms relief, tolerance on it, and its recreational value.

The task of expertise was to examine scientifically and describe the issue of whether there would be objectified changes in physiological parameters of heart rate, blood pressure and pulmonary function through repeated visits in the "Koblenz Salt Caves with the Dead Sea Salt" and how participants will assess its tolerance, its recreational value and relief of ailments symptoms.

The basis of expertise are on-site studies, which was conducted in the period from 06.06.2007 to 13.12.2007 in the "Koblenz Salt Caves with the Dead Sea Salt". The persons who repeatedly visited the "Koblenz Salt Caves with Dead Sea Salt" were surveyed. The collected data were given a pseudonym, and were treated in accordance with the current guidelines for the protection of personal data and used for scientific analysis.

## **Healing treatments in the Dead Sea**

For centuries the therapeutic effectiveness of salt treatments has been known. During treatments the salt is absorbed either through the skin (in the form of baths, wraps, masks, ointments or other) or through the respiratory tract. The most famous natural and valued for their effectiveness are such healing waters as the Kangal springs in Turkey, the Blue Lagoon in Iceland and, of course, the Dead Sea.

The Dead Sea occupies a special place among healing springs because many therapeutically important factors have their influence at the same time. The Dead Sea is the lowest sea in the world (about 420 m below the average sea level) to which the Jordan River flows. It is a salt sea with an area of about 600 km<sup>2</sup>, which has no natural drainage. Due to the dry desert climate, evaporation is very high, so that in the Dead Sea there is a strong accumulation of salt, minerals and trace elements. The salt content is on average about 28%

(salinity of sea water is only about 3%). Also the mineral composition of the Dead Sea (with about 51% magnesium chloride, 30.5% sodium chloride, 14.5% calcium chloride and 4.5% potassium chloride) is significantly different from seawater.

Due to the low position, both the air pressure and the light spectrum (UV filter effect) are unique in the world. This is accompanied by high concentrations of salt in the surrounding air formed by the continuous evaporation of seawater due to the high ambient temperatures.

These factors are mainly responsible for the healing effects of bathing and lighting therapy in the Dead Sea. The patients suffering from chronic skin and lung diseases are seeking to alleviate their ailments. Information on the effectiveness of this healing has been passed since the Ancient Times.

### **Therapeutic Method "Salt Cave with Dead Sea Salt"**

To make other undisputably positive effects of the Dead Sea therapy available in other places, the trade of the Dead Sea substances has been taking place for a long time. In addition to seawater, sediments obtained near the shore and salt are used for application to the skin and for inhalation. In Germany as part of the balneophototherapy a therapeutic method has been developed that simulates the conditions of the Dead Sea.

It is reported that most patients suffering from psoriasis respond well to a 20-30-minute bath in salt brine with high salt concentration, followed by short exposure to UVB radiation. Because of insufficiently proven efficacy, this treatment is refunded by the general health insurance institutions only as a stationary or partial stationary treatment in clinics.

For several years, there is also a therapeutic method of the "Salt Cave with the Dead Sea Salt". Here the salt of the Dead Sea is used in form of block bricks which are laid in the therapeutic room – on its walls, ceilings and floors. The cave is to be simulating by arranging the elements shaping the room. Due to material and technical reasons, this design requires air conditioning (maximum temperature 25°C, maximum air humidity 45%). The lighting is electric, with conventional light sources. The therapeutic session lasts about 45 minutes during which the patients in their clothing rest on sunbeds and are exposed to the air around them with salt content.

In addition, various relaxation support means are offered: music is played as a standard, and in individual cases the relaxation techniques, such as sound therapy or concentration exercises, such as qi-gong are offered.

The difference in relation to the actual situation at the Black Sea is therefore mainly related to environmental factors (atmospheric pressure, air temperature, air movement and humidity) and light (brightness, spectral composition, energy performance). However, comparative studies of the Dead Sea air and the air in the Salt Cave with the Dead Sea salt showed that there are only minor differences. It can be concluded that the paramount importance in the treatments is the inhalation of salty air.

## Measurement instruments and methods

All examinations and treatments were carried out in the "Koblenz Salt Caves with the Dead Sea Salt" owned by Präventiv Well GmbH, Schloßstr. 40, 56068 Koblenz. (our comment- prof. Leyk hired by Praventive Well GmbH to test the salt cave properties, after positive outcome it was bought from Mrs Renata Dutkiewicz-Słowak's company)

There are two therapeutic rooms available, both of which are completely decorated with Dead Sea salt, according to the "Dead Sea Salt Cave" system: the salt is in the form of block bricks on the walls and ceilings and loose on the floor. The treatment consists of a 45-minute stay in one of the caves, with quiet music and dimmed lighting. During this time, the participants rest on relaxing sunbeds.

After about 15 inhalation treatments, a re-examination of the well-being and evaluation of the therapy was conducted. After approximately 30 treatments, the initial examinations were repeated, except for general functional enquiry and anthropometric measurements. A total of 117 people took part in the examination in the Koblenz Salt Cave with the Dead Sea Salt. In summary, it is clear from the report that a large proportion of the examined persons are not healthy and is being treated. Nearly  $\frac{3}{4}$  of the participants regularly take medication.

**Table.** General characteristics of 117 participants

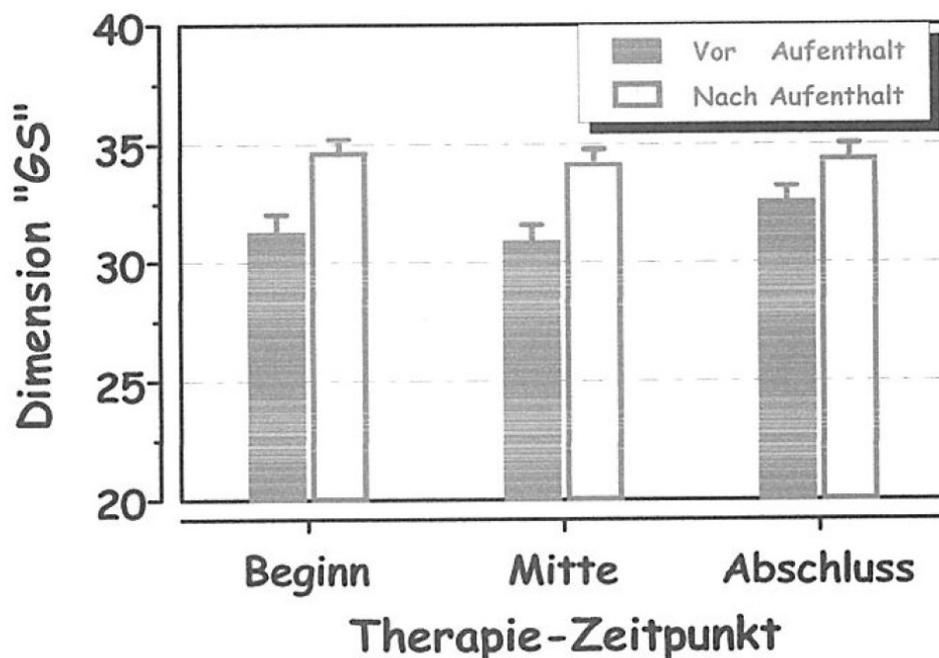
	Women	No. of persons = 76	Men	No. of persons = 41
	AV. ± STANDARD DEVIATION	AVERAGE	AV. ± STANDARD DEVIATION	AVERAGE
Age (years)	55.0 ± 15.3	58	56.3 ± 20.2	62
Height (m)	1.62 ± 0.06	1.63	1.70 ± 0.11	1.72
Weight (kg)	74.0 ± 18.4	70.15	76.7 ± 18.3	78.93

BMI (kg/m <sup>2</sup> )	27.9 ± 6.5	27.02	26.3 ± 5.0	26.46
Amount of body fat (%)	41.4 ± 7.01	42.97	31.6 ± 7.76	32.01
Hip circumference (cm)	105.6 ± 13.3	103	95.8 ± 11.3	99.5
Waist circumference (cm)	89.3 ± 16.0	87.5	95.7 ± 15.7	99

### Well-being and mood before and after stays in the "Salt Cave with the Dead Sea Salt"

While assessing treatments, the people taking part in the examination were asked not only about the assessment on how they felt during treatment, the potential changes in the ailments and the recreational values of the treatment, but also through the use of the multidimensional mood questionnaire (MDMQ) immediately before and after the visit in the "Salt Cave with the Dead Sea Salt" the changes in the mood were to be noticed. The vast majority of the examined confirmed a good tolerance for the treatment. **Almost all people participating in the examinations reported that during a 45-minute treatment they rested "well" or "very well". Apart from inhaling the air with salt content, the sunbed position of the body at quiet music and dimmed light was especially favorable for the regenerative process.**

### Mood of the participants before and after stays in the "Salt Cave with the Dead Sea Salt"



Key:

Dimension „GS“ - well-being dimension  
Vor Aufenthalt - before stay  
Nach Aufenthalt - after stay  
Therapie-beginning  
Mitte - middle  
Abschluss - end

**To sum up, the most important examination results are as follows:**

**1. Cardiovascular function:** During examinations, beneficial cardiovascular effects were observed:

- o Systolic and diastolic blood pressure values were significantly lower at the time of finishing the treatment as compared to the values measured at the beginning of the therapy,
- o There was a significant reduction in heart rate ( $p = 0.000$ ) during the stay in the "Salt Cave with the Dead Sea Salt".

2. **Subjective well-being:** By staying in the "Salt Cave with the Dead Sea Salt" the examined patients were found to have a significant improvement in mood and well-being. The most important thing in this immediate effect was that the mood of those who took part in the examination was much more positive and they became calmer.

3. **Subjective assessment of therapy in the "Salt Cave with the Dead Sea Salt":**

- o The tolerance to therapy and its recreational value was assessed by participants who took part in the examination immediately after a single stay, as well as at the end of the whole therapy as: from good to very good.
- o From a qualitative assessment of changes in ailments, almost  $\frac{3}{4}$  of the examined reported improvement or significant improvement. Only  $\frac{1}{4}$  of participants stated that they did not notice any change in their symptoms.

The results of the various surveys point to the very successful therapeutic success achieved by multiple stays in the "Salt Cave with the Dead Sea Salt". Apart from the significant improvements in moods, it is worth noting, in particular, that the symptoms of ailments are significantly reduced in most participants. The treatment in the sunbed position, dimmed lighting and quiet music apparently support the relaxation and resting process in the

examined persons. It is possible that some of the beneficial effects observed with regard to cardiovascular system are also related to the above factors. However, it is not possible to estimate whether and to what extent the effects of placebo have contributed to the success of therapy.

### **Expert`s recommendations:**

Thinking for a while one can come to the conclusion how easily the therapy for pulmonary disease may be improved. Currently, the people tested during their 45-minute stay are physically resting and apparently benefiting from the various stress-relieving and regenerative processes produced in the "Salt Cave with the Dead Sea Salt". However, in this case the breathing is shallow (low respiratory volume and minute ventilation), large parts of the lungs are not ventilated.

If, like at the Dead Sea, inhaling air with salt content may actually produce airway effects, it certainly makes sense to offer patients with respiratory diseases another form of application. Unlike the stay at the Dead Sea, the exposure time (45 minutes per treatment) for inhalation therapy in the "Salt Cave with the Dead Sea Salt" is extremely limited. However, at the unchanged time of exposure, the significant intensification may be achieved if the persons tested during their stay in the "Salt Cave with the Dead Sea Salt" will perform light physical work. In such a situation, there is an increase in the volume of respiration and the increase in minute ventilation, so that not only there is more and more ventilated air, but also a much larger area of the lungs is ventilated.

The second expert recommendation concerns documentation and diagnostic monitoring of treatments and achieved therapeutic successes. As described above, classical medicine has a fundamental skepticism over the treatment methods of alternative medicine.

Such distrust certainly appears also in the case of treatments in the "Salt Cave with the Dead SeaSalt". This can be concluded, among others, on the basis of the questionnaires surveyed: although most of the participants were in regular contact with doctors and medical staff, only in exceptional cases they got the information about the "Koblenz Salt Cave with the Dead Sea Salt" from the medical sector.

The expert recommends, as part of treatments, the use of further scientifically validated test procedures (eg, bodyplethysmography techniques for the determination of airway resistance) in order to document the success of the therapy. In the medium term, for example, through the creation of a scientific database and publication of relevant results in professional

journals, it would be possible to gain greater acceptance in the medical sector (physicians, alternative medicine providers (Heilpraktiker) and medical staff).

This kind of "initiative" should certainly cause the interest in patients. Scientifically justified and seriously prepared information could significantly increase the interest in the treatments in the "Salt Cave with the Dead Sea Salt".

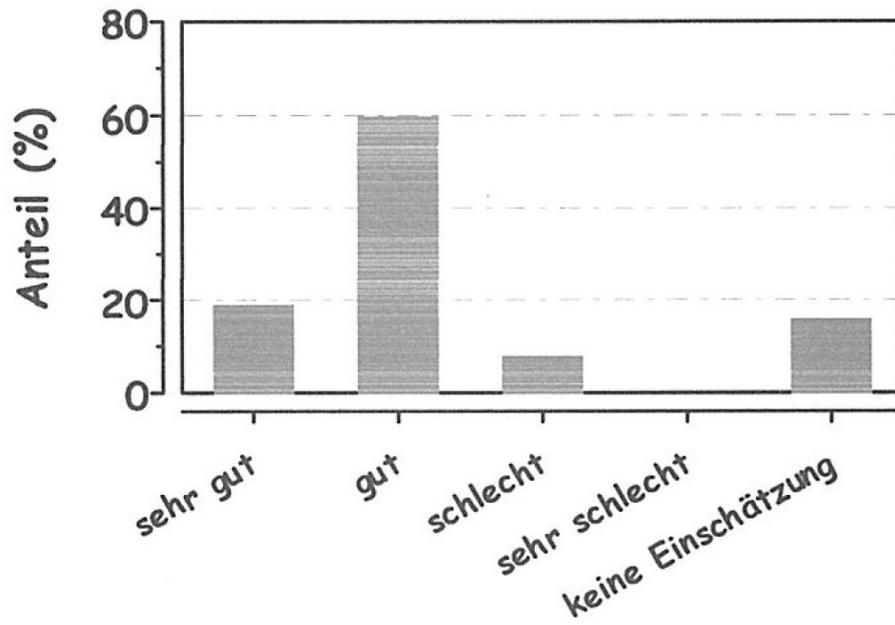
The Dead Sea trade has long been taking place to make available in other places undisputably positive effects of Dead Sea therapy. In addition to seawater, sediments obtained near the shore or salt are used for application to the skin and to inhalation.

For several years, the "Salt Cave with the Dead Sea Salt" therapeutic method has been existing. Here the salt of the Dead Sea is used as block bricks to be laid in the therapeutic room - its walls, ceilings and floors. Comparative studies of the air from the Dead Sea and in the salt cave with the Dead Sea salt have shown that there are at most slight differences. It can be inferred from this that inhaling air with salt content is essential in treatments.

**Answers referring to the entire duration of treatment indicate a very significant therapeutic success: almost  $\frac{3}{4}$  of the examined asked "how your ailments, because of which you came to the treatment, have changed?" chose the "improvement" category (53%) and "significant improvement" (20%). Approximately 27% of respondents reported that they did not find any changes in the ailment. There was no "worsening" or even "significant deterioration" response.**

**Conclusions: The examination proved the success of treatment in the "Koblenz Salt Cave with the Dead Sea Salt".**

**Fig.** Subjective assessment of treatment with regard to ailment reduction after taking into account the entire treatment period.



**Key:**

Anteil (%) - number of respondents

sehr gut - very good

gut - good

schlecht - bad

sehr schlecht – very bad

keine Einschätzung – no assessment