

Spa therapy in dermatology

Najeeba Riyaz, Faiz Riyaz Arakkal

Department of Dermatology,
Medical College, Calicut,
Kerala, India

Address for correspondence:
Dr. Najeeba Riyaz, Arakkal,
Chalapuram, Calicut, Kerala-
673 002, India. E-mail:
najeeba_riyaz@rediffmail.com

ABSTRACT

Spa therapy constitutes the use of mineral springs and thermal mud to soothe and heal various ailments. Like the mineral springs, seas and oceans are also important centers for spa therapy of which the most important is Dead Sea (DS). DS has been famous for thousands of years for its miraculous curative and cosmetic properties. Intensive research is going on using DS minerals in a wide range of dermatological conditions especially psoriasis, atopic dermatitis, vitiligo and other eczemas and several papers have been published in various international and pharmacological journals.

Key words: Spa therapy, balneotherapy, climatotherapy, Dead sea minerals, heliotherapy, ichthyotherapy, mineral springs, thalassotherapy

INTRODUCTION

Mineral springs and thermal mud were used to soothe and heal various ailments since antiquity. This constitutes the basis of spa therapy.^[1] For over 5000 years spa therapy has been used to relax, revive and restore well being. According to De Vierville,^[2] the term “spa” came into the English language from the old French word “espa” which means “fountain”. Another view is that it was derived from the Latin verb “Spagere” meaning “to pour forth”.^[3] Yet another view is that it originated from the Roman words “Sanus Per Aquam” which means “health through water”.

Climatotherapy, thalassotherapy, balneotherapy, heliotherapy, ichthyotherapy, hydrotherapy, fango therapy and crenotherapy constitute different forms of spa therapy. Climatotherapy is that which exploits the atmospheric properties in curing diseases. It is meant for mental relaxation and physical recuperation. Thalassotherapy (from the Greek word *thalassa*, meaning “sea” and “therapiea” meaning “healing”) is a

spa treatment based on an ancient belief in the natural healing properties of sea water. It was developed in seaside towns in Brittany, France during the 19th century. Trace elements of magnesium, potassium, calcium, sodium and iodide found in seawater are believed to be absorbed through the skin. The therapy is applied in various forms, as either showers of warmed sea water, application of marine mud or of algae paste, or the inhalation of sea fog. This type of therapy is common in the Dead Sea (DS) area. Today, thalassotherapy is used as an alternative treatment for medical conditions and has become a popular tourist attraction for relaxation and stress reduction as well as a favorite method of anti-aging.

Balneotherapy (Latin: Balneum, bath) refers to the medical use of water as opposed to its recreational use. Mud bath is also included in balneotherapy. Medicinal clays are also widely used, which is known as fango therapy. Crenotherapy is the combination of water, steam and mud for therapy. Heliotherapy exploits the use of ultraviolet rays of the sunlight. Hydrotherapy involves the use of water in all its forms (internally and externally) to assist in the healing process. “Hamman” is a Turkish-style steam bath, often a communal set of warm, hot and cool rooms. Sea water is heated to 37°C and enriched with oxygen and algae. This treatment reduces muscular pain, stress and tension, restoring the psychic and physical tonus.

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HISTORY OF SPA THERAPY

It is difficult to pinpoint the exact origin of the first spa and spa treatments. It was practiced by the ancient Greeks, Babylonians and Mesopotamians. Homer and other classical writers report that the Greeks indulged in a variety of social baths as early as 500 BC, including hot-air baths known “*laconica*”. The Romans were responsible for the popularity and spread of spa therapy to other parts of the world.^[3] During the Roman Empire, 1352 public fountains and 962 public baths were available for the citizens of Rome.^[4] Roman soldiers sought hot baths to recuperate after prolonged battles. The baths were referred to as “*aquae*”.^[5] The concept of spa flourished with the continued use of the major springs even after the decline of the Roman Empire.^[4]

During the 14th century, Belgium became famous for the healing powers of the mineral hot springs. Between the 16th and 17th centuries many prominent figures like Leonardo da Vinci and Charles Darwin supported the use of spa waters for treating various ailments.

In the late 19th and early 20th centuries, Ferdinand Von Hebra and Louis Duhring, discussed the importance of hydration and bathing for the treatment of psoriasis, ichthyosis and pemphigus.^[6] During the early 20th century, the great spas of North America, such as Bedford springs of Pennsylvania, White Sulfur springs of West Virginia and Hot Springs of Arkansas became popular destinations for the wealthy as well as the ill, who went there to rejuvenate and recuperate.^[6] However, as health care became nationalized and modern medicine became more efficient, the popularity of the spas began to decline.

In the later part of the 20th century and continuing to the present, spas re-emerged as destination resorts and places for health maintenance as a complement to modern medicine. This resurgence in the popularity of the spa sprung from a greater emphasis on wellness and preventive medicine.

Spas were a significant form of entertainment in the ancient periods which may account for their splendor. There is no doubt that these spas were valuable medically and antiseptically. Different traditions involving the spas have evolved in various areas of the world, often coinciding with the religious traditions and natural springs present in that area. Japan started

its first “*onsen*” spa near Izomo in 737 AD. Japan, being a volcanic island, has at least 150 hot springs and 14,000 individual springs which played a great role in spa culture and development. Springs are classified by their temperature and content as hot, simple, carbonate, salt, gypsum, bitter, alum, iron, acidic, sulfur, mirabilite, radium and so on. Each of these springs has various medicinal and healing properties.^[3] In the 19th century, patients suffering from syphilis and other sexually transmitted diseases used to travel long distances to spas and hot springs for a cure.^[3]

Many people around the world believed that bathing in a particular spring well or river resulted in physical and spiritual purification. Forms of ritual purification existed among native Americans, Persians, Greeks, Babylonians, Egyptians and Romans. Today ritual purification through water can be found in the religious ceremonies of Jews, Muslims, Christians, Buddhists and Hindus. These ceremonies reflect the ancient belief in the healing and purifying properties of water.

Spa in India

India has been famous for a century-old tradition of Ayurveda, offering holistic, life-enhancing treatments including yoga techniques. During the pre-Buddhist era, several forms of medical practice had existed in the trans-Himalayan region such as Ihaba (shaman) and Onpo (astrologer) and the prominent system of indigenous therapy developed in this desolate area known as the Tibetan medical system, which has evolved on the basis of available bioresources, minerals and beliefs. Amchis being the practitioners of this ethno-medical system, have enjoyed high respect and social status among the trans-Himalayan Buddhist communities. With the spread of Buddhism in the trans-Himalayan region, Ayurveda began to influence the Tibetan medical system.^[7]

Today, packaged contortion, aromatic rubs, aura imaging and herbal body pummelling are available in abundance. There are some wonderfully refreshing destination spas in the mountains, and enticing resort spas in India. Along with skin treatments and massages, most spas in India have now evolved to include a number of different therapies, such as reflexology, hydrotherapy, aromatherapy and meditation.

Traditional Ayurvedic health resorts are plenty in South India where they flourish as an authentic

cottage industry in the state of Kerala and elsewhere. Rejuvenation therapy through Ayurveda and Yoga is popular all over the world and thus Kerala has become a major center for revitalizing the body and spirit.^[8]

DS Spa

Like the mineral springs, seas and oceans are also important centers for spa therapy of which the most important is DS. It is also known as “salt sea” (in the bible), “asphaltic sea” (by Greeks), “sea of Araba” (by Arabs) and “eastern sea”. DS has been famous for thousands of years for its miraculous curative and cosmetic properties. Aristotle (304-322 BC) was the first to tell the world about the therapeutic values of the DS. By the 18th century, the first scientific research on the DS was made by the French chemist Lavoisier and later by Gay Lussac.

DS is the saltiest sea in the world, being 10 times saltier than the other seas and oceans. The salinity increases with the depth and is almost saturated at the bottom. The salt content of the DS is 350 g/l as compared to 40 g/l in the other seas and oceans. The DS and the mud is a rich source of minerals. About 21 minerals have been identified of which 12 are found in no other seas or ocean. The major minerals are magnesium, potassium, phosphorous, strontium, bromine, sulfur, fluorine, lithium, calcium, chlorine, sodium, iodine, zinc and iron.^[9]

For hundreds of years, the special combination of these minerals has helped to relieve itching and irritation caused by skin diseases like eczema and psoriasis. Thousands of people from all over the world with various skin diseases especially psoriasis visit health spas on the shores of the DS to improve their conditions by immersing themselves in the therapeutic waters. Because of the high salinity, the DS water is highly buoyant and hence the body floats on it and drowning never happens.

Magnesium is a natural moisturizer by enhancing the ability of the skin to retain water. The concentration of magnesium is 15 times higher in the DS. It is essential for cell metabolism. It helps in maturation and differentiation of keratinocytes. Hence it is very useful in psoriatic patients who have a low magnesium level in the serum and scales.^[10] Potassium is also a natural moisturizer. It is an astringent and antibacterial agent. Bromine concentration is 50 times higher. It is well known for its soothing and relaxing actions.

It is a natural antibiotic and anti-inflammatory agent and hence useful in various inflammatory and dry dermatoses like psoriasis, eczema and ichthyosis. Sodium helps to maintain the suppleness of skin due to its water-holding capacity. Hence it is very useful in dry dermatoses like psoriasis and ichthyosis. It also helps in desquamation of hyperkeratotic lesions. Chlorides are proven disinfectants as well. Sulfur helps in collagen synthesis and cellular respiration. Zinc is important for protein and collagen synthesis. It also has anti-inflammatory effects. Hence it is useful in acne, rosacea and wound healing. Calcium acts as a skin cleanser.

Judean asphalt, a bituminous substance rising to the surface of DS, has several medicinal properties. Bitumen is a natural tar having anti-inflammatory effects. Hence it is effective in psoriasis. DS mud, known as “black gold” is a black, soft, greasy substance with the smell of sulfur. It is well known for its soothing, exfoliating and rejuvenating properties. Bathing in mud (balneotherapy) is a well-known method for rejuvenation.^[11]

Role of DS minerals in dermatological therapy

DS salts are an effective, natural treatment for psoriasis. For years, the DS salts have been recognized as a wonderful alternative therapy offering long-term relief. Intense research is going on using the DS minerals and several papers have been published in various reputed journals.

Bathing in the DS is an established treatment for psoriasis. Penetration of electrolytes through the human skin was measured in healthy volunteers and in psoriatic patients after bathing in the DS or in simulated bath-salt solutions.^[12] Significant increase in the levels of serum bromine, magnesium, calcium and zinc was noticed only in the psoriatic patients after bathing in the DS for a period of 4 weeks. In guinea pigs bathed in simulated DS bath-salt solutions containing radio nuclides of calcium, magnesium, potassium and bromine, traces of each radionuclide were detected in the blood and in some internal organs after 60 minutes of bathing. The favorable results of the DS spa treatment of psoriasis may thus be partly due to the penetration of minerals into the body through the skin, with subsequent reinforcement of anti-proliferative mechanisms.

Diluted DS brine and solutions of some of its salts

(chlorides and bromides of sodium, potassium and magnesium) were found to reversibly inhibit cell proliferation in culture.^[13] Bromides were more powerful as inhibitors than their chloride counterparts and potassium salts were more effective than those of sodium and magnesium. Potassium bromide had the strongest inhibitory effect, which equaled that of diluted DS brine at the same concentration. The effect of five selected minerals abundant in the DS brine was studied as the proliferation of fibroblasts grown from psoriatic and healthy skin biopsy specimens in cell culture.^[14] It has been shown that the inhibitory effects of magnesium bromide and magnesium chloride on cell growth were significantly stronger than those of their corresponding potassium or sodium salts. These results indicate that the inhibitory effect of the selected DS minerals is present in healthy and psoriatic skin cells.

The antigen-presenting functions of human epidermal Langerhans cells *in vivo* and *in vitro* were studied by using DS water.^[15] It was found to be inhibited by magnesium ions in the DS water as evidenced by the reduced expression of ATPase and HLA DR and costimulatory B7 molecules, and a suppression of the tumor necrosis factor- α production by epidermal cells *in vitro*.

In a comparative study of psoriatic and healthy persons with DS salts (Tomesa therapy), reduced amounts of detectable Langerhans cells in the epidermis were found in psoriatic patients.^[16] Baths containing sodium chloride in comparable concentrations, however, were without any effect. This study concludes that the anti-psoriatic activity of DS salts is not only due to the physical effects but may also be the result of definable pharmacological actions of the salts on skin cells.

The immediate and delayed effects of balneotherapy (mud therapy) in patients with psoriatic arthritis were studied by Elkayam *et al.*^[17] All patients received daily exposure to ultraviolet rays and regular bathing in the DS. Half of them were treated with mud packs and sulfur baths. There was a significant improvement in the pain and swelling of joints. Addition of mud packs and sulfur baths to ultraviolet exposure and DS baths prolonged the beneficial effects and improved the inflammatory back pain.

Balneology and spa therapy, although not accepted as well-established treatment modalities in dermatology, are used throughout the world.^[18] The therapeutic

properties of DS minerals for skin and rheumatic diseases may be attributed to the unique climatic characteristics and unique natural resources like minerals, bitumen and DS mud, also known as “black gold”. The mechanism by which a broad spectrum of diseases is alleviated by spa therapy may involve mechanical, thermal and chemical effects.

Bathing with the DS bath salt as a sole therapy for psoriatic patients was found to be beneficial as compared to bathing with common salt.^[19] Penetration of DS minerals into the psoriatic skin is an effective factor in this treatment, but applying it clinically requires frequent bathing in the DS or in its bath-salt solution. Application of ethyl cellulose-based transparent varnish with a sustained-release property, incorporated with the DS minerals like magnesium bromide and potassium bromide for 3 weeks, demonstrated elevated levels of magnesium and potassium in their plasma. Hence, the application of DS minerals containing varnish as a clinical treatment for psoriasis has been proposed.^[20]

The DS with its unique optical, chemical and atmospheric properties provides an effective alternative treatment for psoriasis. One thousand, four hundred and forty-eight consecutive psoriatic patients treated at a DS psoriasis clinic were retrospectively evaluated regarding their treatment response and demographic characteristics.^[21] 80-100% clearing was observed in 88% of the patients treated, and 58% had complete clearing.

DS minerals have been found to be effective in inflammatory skin conditions. In a study by Greiner and Diezel.^[22] The DS water which is rich in magnesium ions was used to know the influence of magnesium on inflammation in allergic contact dermatitis induced by 1-Chloro-2,4-Dinitrobenzene (DNCB) in BALB/C mice. Animals challenged with 0.125% DNCB in the presence of magnesium chloride (28% and 14%) demonstrated significantly less pronounced contact dermatitis (ear swelling) than did animals challenged with DNCB alone. In mice challenged with DNCB in combination with sodium chloride (14%), there was no statistically significant difference in the degree of ear swelling. This study shows that magnesium chloride can suppress allergic contact dermatitis.^[22]

Climatotherapy at the DS is a highly effective modality for treating atopic dermatitis. It is also a

highly cost-effective method, as the patients take no medications and experience no side-effects. Successful climatotherapy of atopic dermatitis requires strict medical supervision throughout the whole length of the patient's stay on shore.^[23] The efficacy of DS bathing in atopic patients was studied by Proksch *et al.*^[10] The results demonstrate that bathing in the salt solution was well tolerated, improved the skin barrier function, enhanced the stratum corneum hydration and reduced the skin roughness and inflammation. The favorable effects of bathing in the DS are most likely related to the high magnesium content.

Vitiligo patients constitute the third largest group of dermatological patients who visit the DS for therapy. The DS treatment for vitiligo is based mainly on the gradually increasing exposure of the skin to ultraviolet rays. This apparently stimulates melanocytes to repopulate the affected areas and to function normally. Repigmentation is usually slow and continues even after stopping DS treatment. Excellent results have been observed.^[24]

Rapid initiation of repigmentation in vitiligo with DS climatotherapy in combination with pseudocatalase (PC-KUS) has been observed by Karen *et al.*^[25]

No evidence of skin cancers or sun-induced degeneration or precancerous changes was found following climatotherapy at DS.^[26] A form of "sun-allergy" in nonpsoriatic areas in some individuals has been observed which could easily be controlled with calamine lotion or sunscreen. Generalized dermatitis due to potassium monopersulfate, a strong oxidizing agent that is widely used in pool and spa "shock" treatments, may rarely develop.^[27] Allergic contact dermatitis to other pool sanitation treatments, such as BCDMH (1-bromo-3-chloro-5,5-dimethylhydantoin) has been reported and must also be considered when presented with spa-related dermatitis.^[28]

The DS serves as a health and rehabilitation beauty spa. It holds many beauty center spa and mineral pools where patients can rest in and cure their skin problems and achieve a mental relaxation. DS beauty minerals nurture and tighten the skin and replenish the natural moisture levels to make the skin glow.

In the era when biological treatments for psoriasis are gaining more and more popularity, climatotherapy represents a safe and efficient alternative to the conventional therapeutic modalities. Originating from

Europe, balneo- and spa therapy are becoming popular alternatives for psoriasis treatment worldwide. Blue Lagoon in Iceland, Kangal hot springs in Turkey, and the DS are some unique sites for climatotherapy. The Blue Lagoon geothermal spa is one of the most visited attractions in Iceland. The steamy waters are part of a lava formation. The warm waters are rich in minerals like silica and sulfur and bathing in the Blue Lagoon is reputed to help people suffering from skin diseases such as psoriasis. The water temperature in the bathing and swimming area of the lagoon averages 40°C (104°F).^[29]

The health-giving properties of Turkey's natural hot springs have been renowned since antiquity. The Kangal Fish Spring has a miracle toothless fish ("doctor fish"- Garra rufa) that live at 37°C of heat and are not to be found anywhere else in the world. These wonderful fish never grow more than 10 cm. These omnivores supposedly have curative powers-by eating the dead scales of psoriatic patients (ichthyotherapy). This fished spa is interesting with its climate, fish and water which are used by psoriatic patients.^[30]

CONCLUSION

In a nut shell, spa therapy is an exciting concept for prevention and treatment of dermatological diseases. Therapeutic spas and baths offer an atmosphere of health and physical fitness by their chemical, thermal, mechanical and immunological actions. They also provide relaxation and stress relief. Spa therapy is effective individually or as a complement to other medical therapies.

Recently, the concept of spa therapy has been changing. There is an emergence of medical spa (Medi-spa) which is a fast-growing segment of the 15-billion dollar spa industry. It incorporates traditional spa therapy into modern medical measures. Although medical spas have been in existence since ancient times to treat a wide variety of ailments the modern concept of the medical spa combines relaxation with medical rejuvenative procedures.^[31] Hence, a dermatology spa is a combination of the traditional spa with cosmetic procedures which range from chemical peels to laser rejuvenation.

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Multiple Choice Questions

1. The word "spa" in French means
 - a. Fountain
 - b. To pour forth
 - c. Health through water
 - d. Aqua
2. The salt content of Dead Sea in g/l is
 - a. 40
 - b. 150
 - c. 250
 - d. 350
3. There are _____ number of minerals in Dead Sea
 - a. 12
 - b. 21
 - c. 31
 - d. 42
4. Inhibition of fibroblast proliferation after bathing in Dead Sea water is mainly due to
 - a. Chlorine
 - b. Potassium
 - c. Bromine
 - d. Fluorine
5. Balneotherapy involves:
 - a. Dead sea water
 - b. Dead sea mud
 - c. Sun exposure
 - d. UV exposure
6. The most common dermatological problem responding to Dead Sea bath
 - a. Lichen planus
 - b. Vitiligo
 - c. Atopic dermatitis
 - d. Psoriasis
7. 'Black gold' is
 - a. Dead Sea mud
 - b. Dead Sea mineral
 - c. Judean asphalt
 - d. Sulfur
8. The importance of bath as a treatment for psoriasis was stressed by
 - a. Von Hebra
 - b. Robert Willan
 - c. Louis Duhring
 - d. a and c
9. The first person to highlight the medicinal properties of Dead Sea was
 - a. Aristotle
 - b. Kaposi
 - c. De Vierville
 - d. Da Vinci
10. "Laconica" is
 - a. Dead Sea bathing
 - b. Hot air bath
 - c. Mineral spring bath
 - d. Mud bath

Answers
1.a, 2.d, 3.b, 4.c, 5.b, 6.d, 7.a, 8.d, 9.a, 10.b