

Thalassotherapy, Health Benefits of Sea Water, Climate and Marine Environment: A Narrative Review [†]

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Abstract: The aim of this review was to summarize any evidence-based clinical uses of thalassotherapy. PubMed was searched up to the 15th July 2021 for relevant studies. Overall, 560 articles were found and 14 studies were included in this review. Clinical efficacy of thalassotherapy was mostly tested for skin problems (psoriasis, atopic dermatitis, vitiligo) and rheumatic disorders (fibromyalgia, ankylosing spondylitis). Disease severity and the patients' quality of life significantly improved after intervention, with the majority of evidence for psoriasis and fibromyalgia. Thalassotherapy can be associated with symptomatic improvements in some health conditions. Further studies on the topic are recommended.

Keywords: environmental health; marine climate; medicine; review; sea water; thalassotherapy

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1. Introduction

Seas cover 70% of our planet's surface and have always been important since ancient times for many human activities (i.e., feeding habits, long travels, commercial exchanges, religion, arts, spirituality and healing rituals) (Figure 1) [1]. Therapeutic uses of sea water date back to ancient Egypt and are characterized by a long-standing tradition in many countries [2]. "Thalassotherapy", a Greek-derived term originating from the combination of "thalassa" (sea) and "therapy", is still empirically recommended for patients with some skin, rheumatic or respiratory diseases [3]. Broadly speaking, thalassotherapy includes not only baths in sea or sea-like salty water, but also seaweed or sand baths, sunlight exposure, inhalation of marine aerosol and, in general, any controlled interaction with marine environments and their natural elements for health-promoting purposes [4]. With rising attention over human-environment relationships and empirical evidence from traditions, biomedical research has recently started to explore the role of different natural settings for well-being improvement [5], including potential benefits offered by coastal areas, their waters and climate.

The aim of this review was to briefly summarize evidence-based clinical uses of thalassotherapy.

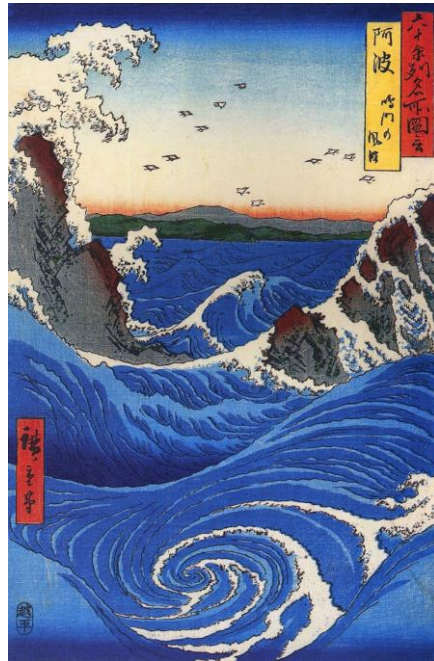


Figure 1. Sea waves in Japanese art. Picture freely released by Karen Arnold under the “CC0 Public Domain” licence. Available online at: <https://www.publicdomainpictures.net/> (accessed on 20 July 2021).

2. Methods

This research was designed as a narrative review of the scientific literature. PubMed was searched from inception up to the 15 July 2021 for clinical studies about the efficacy of controlled exposure to marine or marine-like (i.e., salt lake) environments for any health condition. The MeSH term “thalassotherapy” was used to retrieve relevant articles and narrow down the search. The following PICOS criteria were chosen for inclusion and exclusion of research items:

- **P (population):** healthy subjects or patients with any disease diagnosed in accordance with international guidelines.
- **I (intervention):** thalassotherapy, defined as any controlled interaction with marine or marine-like environments and their natural elements for health-promoting purposes.
- **C (comparator):** any type of comparison, including no control.
- **O (outcomes):** any measurable clinical improvement, including changes in symptom scores and health-related quality of life.
- **S (study design):** any type of clinical study involving human subjects. In vitro and in vivo laboratory experiments were excluded, as well as commentaries, technical reports and literature reviews.

Articles were excluded when their full-text version was unavailable/irretrievable or when they had no English summary. Studies published prior to 1980 were also excluded for being too outdated. Retrieved evidence was summarized and critically discussed.

3. Results

Overall, 560 articles were found, but only 152 studies were published after 1980. Research items matching the PICOS criteria were 14 [6–19]. Results of studies eligible for inclusion were reported in Table 1. Clinical efficacy of thalassotherapy was tested for the following health conditions:

- Skin problems, mostly psoriasis, but also atopic dermatitis and vitiligo.

- Rheumatic disorders, such as fibromyalgia and ankylosing spondylitis.

Thalassotherapy included a combination of sea water balneotherapy, climate therapy, controlled sunlight exposure, physical exercises and rehabilitation programs. Sessions were held in different locations, ranging from the Dead Sea (a salt lake) to the Atlantic Ocean. Treatment duration was quite heterogeneous, but lasted 3 to 6 weeks on average. Results indicated that thalassotherapy can significantly improve disease severity, symptoms and quality of life in different health conditions. Only 6 trials had a control group, whereas the other studies had an observational or a pre-post design.

Table 1. Summary of evidence from included studies.

Condition	Population (n)	Intervention type	Location	Control type	Treatment duration	Outcomes	Results	Study design	Reference
Psoriasis	254 adults	C-BT	Atlantic Ocean (Canary Islands)	/	3 weeks	↓ disease severity	Pre-test PASI: 8.6 [7.7–9.4] Post-test PASI: 1.6 [1.2–2.1]	US	[7]
	85 adults	C-BT	Dead Sea	/	>5 days	↓ disease severity	Pre-test PASI: 17.5 ± 11.0 Post-test PASI: 4.4 ± 4.6	US	[10]
	17 children	C-BT	Dead Sea	/	2 weeks	↓ disease severity	35.3% of patients showed excellent improvement, 29.4% moderate improvement, 35.3% poor response	US	[8]
	10 adults	C-BT	Dead Sea	/	4 weeks	↓ parakeratosis ↓ dermal immune cell infiltration ↑ enkephalin levels		US	[9]
	18 adults	C-BT	Dead Sea	/	4 weeks	↓ disease severity	Pre-test PASI: 14.8 ± 5.4 Post-test PASI: 1.8 ± 3.1	US	[19]
	70 adults	C-BT	Dead Sea	/	>5 days	↓ disease severity	Pre-test PASI: 16.6 ± 11.0 Post-test PASI: 4.0 ± 4.2	US	[6]
Atopic dermatitis	64 adults	C-BT	Dead Sea	/	4 weeks	↓ disease severity	Pre-test PASI: 31.7 ± 13.3 Post-test PASI: 1.4 ± 1.9	US	[11]
	30 adults	BT with Dead Sea salts	/	Tap water	6 weeks	↓ TEWL ↓ skin inflammation	Post test difference between groups (TEWL): -19%	RCT	[12]
	116 children	C-BT	Dead Sea	Steroid drugs	4 weeks	↓ disease severity	Post-test SCORAD (int.): 87.5 ± 13.4% Post-test SCORAD (con.): 86.1 ± 11.3%	RCT	[13]

Vitiligo	436 adults	C-BT	Dead Sea	/	Variable	↑ skin pigmentation	3.9% of patients showed total repigmentation; 81.4% good repigmentation	ORS	[14]
Ankylosing spondylitis	107 adults	RT	Mediterranean Sea (Turkey)	The same program, but in Norway	4 weeks	↑ spinal mobility ↓ symptoms	Pre-post test ASAS (int.): -3.7 ± 2.2 Pre-post test ASAS (con.): -1.7 ± 1.9	RCT	[15]
	134 adults	C-BT + usual care	Mediterranean Sea (Tunisia)	Usual care	2 and a half weeks	↑ QoL ↓ pain	Post test QALYs-VAS (int.): 0.23 ± 0.08 Post test QALYs-VAS (con.): 0.19 ± 0.06	RCT	[17]
Fibromyalgia	46 adults	C-BT + exercise	Atlantic Ocean (Brazil)	The same program, but in a pool	12 weeks	↑ QoL ↓ pain ↑ mood	Pre-post test FIQ (int.): -40.6 ± 11.1 Pre-post test FIQ (con.): -38.7 ± 10.9	RCT	[18]
	58 adults	C-BT + exercise	Mediterranean Sea (Tunisia)	Usual care	2 and a half weeks	↑ QoL ↓ pain ↑ mood	Pre-post test FIQ (int.): -6.3 ± 11.4 Pre-post test FIQ (con.): -0.9 ± 10.2	RCT	[16]

Notes: ASAS: ASsessment in Ankylosing Spondylitis (improvement criteria); BPSS: Beer Sheva Psoriasis Severity Score; BT: Balneotherapy; C-BT: Climato-Balneotherapy; Con.: Control; FIQ: Fibromyalgia Impact Questionnaire; Int.: Intervention; ORS: Observational Retrospective Study; PASI: Psoriasis Area Severity Index; QALYs: Quality-Adjusted Life Years; QoL: Quality of Life; RT: Rehabilitation Therapy (set in a thalassotherapy center); SCORAD: SCORing Atopic Dermatitis; TEWL: Trans-Epidermal Water Loss. ↑: significant increase; ↓: significant decrease.

4. Discussion

There is evidence to support the notion that thalassotherapy can be beneficial to improve several diseases, especially chronic inflammatory conditions and degenerative illnesses. Mechanistic studies suggest that these benefits may be due to a combined action of different natural components:

- Highly mineralized water immersion, associated with symptomatic improvements in osteoarthritis, back pain of rheumatic origin, fibromyalgia, psoriasis, atopic dermatitis, chronic venous insufficiency of lower limbs and other health problems [20].
- Marine climatic conditions, characterized by pleasing mild temperatures and sunny weather [21].
- Controlled sunlight exposure, beneficial for patients with psoriasis and to boost the body's vitamin D supply [22].
- Interaction with biogenic compounds released in the environment by seaweed, algae and coastal vegetation [23].
- Hot sand baths, possibly useful for some rheumatic diseases [24].
- Marine aerosol inhalation, with beneficial effects for some respiratory conditions [25].

Health benefits of thalassotherapy may last for around 90 days after treatment, especially in patients with psoriasis [19]. Some concerns were expressed for long-term clinical safety of this therapeutic practice, in particular for potentially higher incidence of skin cancer due to excessive sunlight exposure. In this regard, it is essential to be medically checked before undergoing a cycle of thalassotherapy and to strictly follow professional recommendations in order to avoid high ultraviolet radiation exposure [26].

In conclusion, thalassotherapy can be associated with symptomatic improvements in some health conditions. Further studies on the topic are recommended to better quantify the effect size of intervention, as well as to assess long-term benefits, risks and any moderators of the effect.

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