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## **PHYTOBALNEOTHERAPY (“HAY BATHS”) : BETWEEN TRADITION AND MODERN MEDICINE**

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Phytobalneotherapy is a crenotherapeutic treatment consisting in immersing oneself in pools of fermenting alpine grass, to exploit its heat and rich aromatic components. The traditional expression “hay baths”, corresponding to the German “Heybaeder”, is actually inappropriate, as notes Barberi in 1993, because in reality for phytobalneotherapy only fresh grass, or perfrigerated grass to avoid desiccation [1], is used. The traditional name, although substantially incorrect, undoubtedly derives from the fact that this procedure was originally linked to haymaking practices. The expressions “grass baths” or more simply “phytobalneotherapy” seem, thus, more accurate.

Bathing in fermenting alpine grass for alleviation of “joint pains” is a rather ancient practice traditionally carried out in some areas of Trentino (Italy), Alto Adige (Italy) and Austria. There is some evidence that already at the beginning of the XIX<sup>e</sup> century peasants from some areas of the Dolomites, in the evenings, tired after a whole day haymaking, would lay down on a bed of freshly cut grass, and wake up in the mornings feeling perfectly refreshed and in great shape. Throughout the second half of the XIX<sup>e</sup> century, such folk practice gradually begun to ascertain itself as a cure. In 1871, Dr. Lersh from Aachen in one of his writings on phytobalneotherapy, observed how at Passo degli Occhimi (near Bolzano, Italy) not just peasants during haymaking season, but all who suffered from “joint pains” would submit themselves to these grass baths [3].

Today, only Garniga Thermal Resort, near Garniga Terme (Trento, Italy), still follows the original traditional phytobalneotherapeutic methods [4-7]. The herbs used for the phytobalneotherapy treatments at this thermal resort come from the Bondone Mountain meadows (Trento, Italy), situated between 1200 and 1500 metres altitudes. This is a special composite blend of different herbs, and amongst the various botanical species comprising the Bondone grass, of note are the woundwort, arnica, Aaron’s beard (or great St. John’s wort), time, carline, pasqueflower, cinquefoil, blueberry, and yarrow [4-10]. Harvesting at these altitudes not only guarantees a peculiar floral mix, but also avoids finding insects such as ticks and other parasites, virtually inexistent over 1200 metres above sea level.

Mowed, collected and transported down to the valley, the grass is then placed in vats 50 cm thick, where, left to ferment, it develops heat thanks to its particular metabolic

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activity as well as the metabolism of the microbic flora present. After 1-2 days, the deeper layers reach temperatures of 60° C or more ; this temperature is maintained throughout the whole thermal treatment [11].

For the actual phytobalneotherapy treatment, the naked patient is immersed in the warm grass and enveloped with a layer 10-20 cm thick, every day for 20 min (Fig. 1).



Fig. 1.

After each bath, the patient then lays on a reaction couch, wrapped in a woollen blanket, for 30-45 min. The reaction, characterized by profuse sweating, gradually diminishes in the space of 3-4 hours. A complete cycle of phytobalneotherapy lasts for ten (10) days, with a one day interval halfway through the cure. Such break is made necessary due to the possible manifestation, in some patients, of a mild “thermal crisis”, characterized by asthenia, migraines, insomnia, malaise, heightening of joint pains, manifesting itself after the third/fourth bath [11,12].

As for other thermal therapies, the actual mechanism of action of phytobalneotherapy is as yet not completely known, although it's probably ascribable to a series of different combined mechanical, physical, chemical and physio-chemical effects [11]. Such mechanisms may be distinguished in aspecific, common to hot baths in general, and specific, dependent upon the composition of the particular herbs used [13,14]. Hot stimuli may influence muscle tone and pain intensity, helping to reduce muscle spasm and increase the pain threshold in the nerve endings. It has been reported that thermal stimulation increases extensibility of collagen-rich tissues and improves joint range of motion [13].

The baths' high temperatures induce rapid superficial hyperaemia together with an initial deep decongestion, followed by active hyperaemia of the deep tissues, including periarticular tissues (capsules, ligaments). The most important outcomes caused by the hyperaemia and by the increase in the circulation speed are represented by the elimination of the phlogistic mediators, the reduction in muscle hypertone, and the imbibition of the periarticular tissue [13]. In particular, it has been demonstrated by measuring limbs circumference, by bio-impedanciometry, and by measuring skin moisture, that, by the end of the phytobalneotherapy treatment, there is a marked reduction in tissular imbibition [15].

Furthermore, thermal stress causes a significant increase in the serum levels of pituitary hormones and opioid peptides such as endorphins [16]. These effects of phytobalneotherapy on muscle tone, joint mobility and pain intensity may be effective in all the rheumatic diseases characterized by painful symptoms and prolonged muscle tension. Furthermore, during phytobalneotherapy an increase of blood levels of Heat shock protein 70 has been shown (Hsp 70) in patients with OA [17]. The Hsp 70 in cell cultures of chondrocytes and in models of arthritis has been shown to produce protective effects from cellular injuries and from apoptosis [18].

Other effects of phytobalneotherapy may be due to the active ingredients contained in the fermenting grasses, rich in aromatic species, which, aided by vasodilatation, are able to enter the organism in the form of essential oils, terpenes and other aromatic substances [19].

Principal indications for Phytobalneotherapy include OA, as well as other degenerative joint pathologies, extra-articular rheumatisms, both more general like Fibromyalgia, or more localized such as scapulo-humeral periartthritis, tendinitis, non-inflammatory bursitis, and canalicular syndromes such as carpal tunnel syndrome and lumbosciatica not in acute phase [12,20].

Studies performed on the behaviour of a series of physiological parameters (arterial blood pressure monitored through time, cardiac frequency, biohumoral parameters, body temperature measured during the baths) [15], and careful monitoring for possible onset of collateral effects, mainly in patients presenting co-morbidities and of advanced age, have demonstrated the excellent tolerability of phytobalneotherapy [12,20]. Vascular forms such as previous myocardial infarction, previous ictus, major arrhythmic disorders, obliterating arteriosclerosis, if properly stabilized, do not prevent taking the baths. Presence of arthroprosthesis are not considered a contraindication. Presence of varicose phlebopaties of the lower extremities has allowed to observe a clear reduction of venous turgidity (a normal finding even for those patients without venous varices) and no sign of intolerability. No allergic reaction has been noted for those patients with known personal history of allergies, not even for those with documented "hay" fever, pollen allergies or food intolerances [14]. Few cutaneous papules, usually non itchy, frequently appear, resolving themselves spontaneously in a few days simply continuing with the cure. 10 % of patients may suffer a worsening of the joint pain symptomatology immediately after completing the entire baths cycle ; however this does not entail a reduction of the benefits seen during medium- and long-term follow-up. Appearance of a real

“thermal crisis” is extremely rare, and it seldom implies an interruption of the cure [12-20]. Exclusion criteria are basically limited to those patients with non stabilized ischemic cardiopathies, decompensated cardiopathies, decompensated nephropathies and hepatopathies, other serious internistic forms, neoplasms (within the 5<sup>th</sup> year), skin pathologies involving a continuous cutaneous lesion, acute inflammatory processes, active phlebitis or phlebothrombosis ; patients presenting articular forms in a phase of evident phlogistic activity also need to be excluded.

## **Clinical studies in rheumatic diseases**

The efficacy of phytobalneotherapy in rheumatic diseases is bolstered by ancient tradition. However, despite its long history and popularity, there is a marked lack of clinical validation of its efficacy and tolerability in current literature.

Fioravanti et al. [21] evaluated the efficacy and tolerability of a cycle of phytobalneotherapy through a single-blind, controlled, randomized trial in patients with primary Fibromyalgia syndrome (FMS).

Fifty-six females with primary FMS who met the ACR criteria [22] and were aged between 33 and 67 years, with FMS duration of 11– 45 months, were included in the study. All patients had been taking pharmacological therapy for at least 3 months, with poor results, and at baseline they had at least 11 of the 18 tender points specified in the ACR criteria.

The patients were randomly allocated to two groups : 30 were submitted to phytobalneotherapy at the thermal resort of Garniga Terme (Trento, Italy) (Group I) and the other 26 were considered as controls (Group II). Group I patients were submitted to 10 generalized daily immersions of 20 min each in warm (50-58°C) grass. The grass used was grown 1200-1500 m above sea level, on Monte Bondone (Trento, Italy). The cycle comprised of 10 baths, with a day of rest after the fifth bath.

Group II continued the pharmacological treatment alone.

Patients were evaluated using the Fibromyalgia Impact Questionnaire (FIQ) [23], Tender Points Count (determined by digital pressure), Health Assessment Questionnaire (HAQ) (24) and Arthritis Impact Measurement Scales (AIMS1) [25], at baseline, after 10 days, then after 12 and 24 weeks.

Patients were recommended to not modify their pharmacological treatment during the study period, and only paracetamol (acetaminophen) was administered orally when necessary.

Data at baseline demonstrated that the clinical pictures were similar in the two groups of patients and no significant differences were observed in the evaluation parameters. Patients submitted to phytobalneotherapy showed visible and significant improvement of all evaluation parameters at the end of the treatment, which persisted during the follow-up period. No significant differences were found for the control group (Table I). Regarding the tolerability, none of the patients presented side effects.

In conclusion, these results show the beneficial effects of a cycle of phytobalneotherapy in a group of patients with FMS, who are poor responders to pharmacological

**Table I : Evaluation parameters (median-interquartile range) in FMS patients submitted to phytobalneotherapy (Group I) and control group (Group II) during the study [21]**

		Baseline	10 days	Week 12	Week 24	Friedman test
<b>FIQ</b>	Group I	60.86 (53.23-65.37)	43.10 (41.13-48.53)*	47.53 (37.71-58.21)*	44.83 (42.93-49.24)*	<b>p&lt;0.001</b>
	Group II	62.38 (56.76-73.99)	67.23 (58.33-71.73)	71.25 (52.07-81.25)	66.01 (52.08-76.28)	
<b>Tender Points Count</b>	Group I	14 (13-16)	11 (9-14)*	10 (8-14)*	10 (7-12)*	<b>p&lt;0.001</b>
	Group II	14 (13.75-16)	16 (14-18)	16 (14-18)	16 (14-18)	
<b>HAQ</b>	Group I	0.870 (0.870-1.120)	0.50 (0.25-0.75)*	0.62 (0.37-0.87)*	0.62 (0.25-0.87)*	<b>p&lt;0.001</b>
	Group II	1.25 (0.87-1.50)	1.25 (0.9675-1.403)	1.25 (0.8075-1.593)	1.12 (0.84-1.495)	
<b>AIMS1</b>	Group I	2.22 (2-2.67)	1.78 (1.44-2.11)*	1.78 (1.44-2.11)*	1.44 (1.22-1.89)*	<b>p&lt;0.001</b>
	Group II	2.44 (2.053-3.468)	2.66 (2.19-2.883)	2.66 (1.77-3.358)	2.77 (1.88-3.44)	

\* p<0.001 Dunn's post hoc test

treatments. Phytobalneotherapy can therefore represent a useful aid alongside the usual pharmacological and physio-kinesitherapy in FMS patients.

The aim of Miori et al. [26] was to evaluate in an observational study the long term efficacy and persistence in time of one cycle of phytobalneotherapy in a group of patients suffering from gonarthrosis, in comparison with the outcome of a conventional medical treatment and physio-kinesitherapy.

142 patients with primary OA who met the ACR criteria [27] were included in the study : 54 patients (group A) were treated with a single course of phytobalneotherapy with grass baths, 58 patients (group B) continued with their usual outpatient care, and 30 patients (group C) were treated with a course of physio-kinesistherapy (FKT).

For each group of consecutively treated patients the Authors evaluated the Lequesne algo-functional Index [28], the drug consumption, the frequency of the patient-physician contacts and laboratory or radiological examinations after 10-15 days of treatment and at 3, 6, 9 and 12 months with blind telephonic follow-up.

The mean Lequesne-score at basal time was  $7.5\pm 3.3$ ,  $11.9\pm 5.3$  and  $11.0\pm 2.7$  in group A, B and C respectively. In each group this score diminished at the end of the treatment ( $p<0.001$ ). At 3, 6, 9 and 12 months the score remained lower than at basal time in group A ( $p<0.001$ ) and group B ( $p<0.01$ ), but not in group C. Drug consumption, patient/physician contacts and laboratory examinations were 5 times lower for group A than for group B and group C at basal time and throughout the follow-up.

The study underlines the mid-long term efficacy of grass baths on both pain and functionality in knee osteoarthritis ; this effect, compared to basal values, was even more evident at 3 and 6 months than that of conventional medical care. FKT shows improvement only at the end of the treatment, although not long-lasting.

## Conclusion

On the basis of an experience consolidated through time and the initial scientific evidences available to date, phytobalneotherapy could represent an useful aid in the treatment of some forms of rheumatic pathologies. This therapy could also represent a viable alternative for all those patients who cannot tolerate conventional pharmacological treatments or who present serious risks for collateral effects.

The validity of such treatment is dependent upon respecting some basic general rules, such as : correctness of both the diagnosis and the active phase of the pathology, accurate assessment of the patient's general health status to exclude potential contraindications, and a good knowledge of the therapeutic medium utilized, including its indications and possible side-effects linked to it.

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