

UOSD ANESTHESIA AND RESUSCITATION
CECINA HOSPITAL

PROTOCOL
INTERVENTIONAL CLINICAL STUDY

Study Title:	<i>A Monocentric, Randomized, Controlled, Non-Profit Interventional Study on the Effects of Forest Therapy in Patients With Fibromyalgia</i>
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PROTOCOL APPROVAL

The Investigators:

- approve this Protocol;

declare that the study will be conducted in accordance with the provisions of this Protocol.

Dr. Ubaldo Riccucci

06/08/2025

Date

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Background and Rationale

Fibromyalgia: evidence of efficacy of nature-based interventions

Fibromyalgia is a syndrome affecting approximately 2% of the general population. It is more frequent in women, although it also occurs in men. Fibromyalgia has a marked impact on daily activities and is characterized by chronic widespread musculoskeletal pain and increased pain sensitivity (allodynia and hyperalgesia), in the absence of diagnosed structural disorders affecting muscles, tendons, ligaments, and joints. It is often accompanied by fatigue, sleep disorders, paresthesia, joint stiffness, headache, cognitive problems, and symptoms of depression and anxiety. The etiopathogenesis of the disease remains poorly understood, although sensitization of the central nervous system appears to be involved, leading to an imbalance between descending inhibitory and facilitatory pain pathways, both in the development and in the chronification of pain. Given the multidimensional nature of the disease and the high direct and indirect health care costs, which impose a substantial burden on health systems in developed countries, a multicomponent approach combining pharmacological and non-pharmacological interventions is often recommended [1].

Very few studies have tested and evaluated the effects of immersion in forest environments on symptoms related to fibromyalgia.

A 2015 study conducted in Spain was performed in a mature forest (trees older than 50 years) and in a young forest (trees younger than 50 years). The former was dominated by oaks with a clean understory, while the latter was also dominated by oaks but had a greater presence of beeches, open shrub areas, and dense understory. The study included 30 participants, all women, distributed between the two forests, aged 20 to 70 years and with a mean age of approximately 62 years, all diagnosed with fibromyalgia. Participants performed daily 1.25-hour walks for 6 days over 2 weeks [2]. At the beginning and at the end of the experimental period, participants completed the Revised Fibromyalgia Impact Questionnaire (FIQR) [3] (available in Italian on the G.U.I.D.A. Society website, <https://www.si-guida.it/>) and the State-Trait Anxiety Inventory (STAI) [4], which had also been used in the experimental campaign coordinated by CNR-IBE [5]. Other questionnaires were also administered, including daily symptom progression of fibromyalgia during the experimental period (days of generalized discomfort, intense pain, insomnia, and well-being) and a self-assessment of the benefits of the study, with 9 questions on the final day of the experiment. Before and after each walk, blood pressure, heart rate, saturation, and body temperature were measured. Meteorological variables were measured continuously.

The FIQR outcomes showed no significant differences between the two groups, with a general improvement in fibromyalgia symptoms and significant benefits with respect to anxiety symptoms and perceived tenderness levels. Furthermore, unlike the young-forest group, the mature-forest group reported significant differences between the beginning and the end of the experiment in the number of days with intense pain, insomnia, and well-being. The overall self-assessment at the end of the experiment was better for the participants in the mature forest, especially with regard to perceived relaxation during the experiences and willingness to recommend or repeat the experience. The authors attributed the limited statistical significance to the short duration of the experience (2 weeks), recommending at least 8 weeks, and attributed the better results in the mature forest to monoterpenes, which were likely more abundant (although not measured) in that environment because of its higher degree of natural biodiversity.

Another Spanish study published in 2020, based on a previously published protocol [6], was a randomized clinical trial (RCT) with 169 patients with fibromyalgia, 99% of whom were women. Participants were divided into two experimental arms: one arm followed only conventional therapy ("TAU"; control group), while the other followed conventional therapy plus a series of nature-based activities, including pain neuroscience education (PNE), exercise therapy (TE), cognitive behavioral therapy (CBT), mindfulness, yoga, and shinrin-yoku (forest bathing), referred to as "TAU + NAT-FM" (intervention group). The experiences lasted 2 hours each week for 12 weeks and were conducted in two forests near the city of Barcelona [1]. The primary outcome was again the FIQR questionnaire, while secondary outcomes were

the Visual Analog Scale (VAS) for measuring fatigue and pain [7], the Hospital Anxiety and Depression Scale (HADS), the 36-item Short Form Health Survey (SF-36) for physical functioning, the Positive and Negative Affect Schedule (PANAS), the Rosenberg Self-Esteem Scale (RSES), and the Perceived Stress Scale (PSS-4), in addition to other tools used to monitor participants' health status, including Ecological Momentary Assessment (EMA), used to monitor in real time the short-term impact of each activity on the patients' daily life.

Compared with the control condition represented by conventional treatment alone (TAU), the intervention including nature-based activities (TAU + NAT-FM) yielded significant post-treatment outcomes with large effect sizes for the primary outcome (functional impairment measured by FIQR) and for the following secondary variables: pain, fatigue, anxiety, depression, and physical function. Significant effects were also reported for process variables such as kinesiophobia, pain catastrophizing thoughts, perceived personal competence, and the cognitive emotion regulation subscales (refocusing, planning, positive reappraisal, and catastrophizing), indicating a positive effect on emotional, cognitive, and behavioral functioning. These large effect sizes had already been achieved at 6 weeks of treatment for functional impairment, anxiety, kinesiophobia, perceived personal competence, and positive reappraisal. In addition, significant results with moderate effect sizes were obtained at 6 weeks for pain, fatigue, physical function, perceived personal competence, refocusing (CERQ), and planning (CERQ). Beneficial results emerged as therapy progressed, but by 6 weeks there was already a significant, although not yet complete, improvement in the main outcomes analyzed in patients with fibromyalgia.

With respect to the individual activities, it is noteworthy that yoga and forest bathing were the only activities producing significant improvements in all variables analyzed, proving particularly promising for improving affective valence, arousal, dominance, fatigue, pain, stress, and self-efficacy.

The authors therefore concluded that the TAU + NAT-FM intervention, compared with TAU, could emerge as an adjunctive therapy conceived as a next-generation therapeutic intervention that not only improves the core symptoms of this common and costly disease, fibromyalgia, compared with usual treatments, but is also advantageous from both the social perspective, because of the high use of public resources, and the economic perspective, because of the high consumption of health care resources and work losses associated with this disease. Importantly, this second study [1] had a much longer duration (12 weeks) than the first (2 weeks) [2], even considering the first endpoint at 6 weeks.

A further Spanish study published in 2025, conducted in individuals with fibromyalgia and chronic fatigue syndrome/myalgic encephalomyelitis, reported statistically significant results with effect sizes generally ranging from large to very large in several state psychological domains, including those reconstructed using the STAI and POMS questionnaires, after a slow 3-hour walk along a 3-km forest trail guided by a specialized psychologist and assisted by a guide for safety [8]. Consistently with previous studies, this study did not show a significant short-term change in pain assessed by VAS.

With regard to the determinants of the positive effects of forest-immersion experiences on symptoms associated with fibromyalgia, a 2019 review reported that cytokines have emerged as a target for the treatment of diseases associated with inflammatory conditions such as neuropathic pain and fibromyalgia (a rheumatic syndrome that the authors considered inappropriately defined as non-inflammatory), because cytokines contribute to the status quo of rheumatic syndromes such as fibromyalgia. Anti-inflammatory cytokines therefore represent a set of regulatory molecules capable of controlling the pro-inflammatory cytokine response [9]. The authors identified at least 24 monoterpenes that modulate cytokine production, which appears to be the main pharmacological mechanism by which these compounds attenuate the inflammatory response. A reduction in one or more pro-inflammatory cytokines, such as TNF-alpha, IL-1 beta, IL-6, and IL-8, was observed for almost all the monoterpenes studied. Increased levels of the anti-inflammatory cytokine IL-10 have been shown to play an important role in the anti-inflammatory effect of monoterpenes, a feature more prevalent among monocyclic alcohol monoterpenes such as alpha-terpineol, menthol, and carvacrol. Reduced production of pro-inflammatory cytokines and mediators, together with increased release of anti-inflammatory cytokines, are key mechanisms in the management of inflammatory responses. Several anti-inflammatory molecules targeting pro-inflammatory cytokines, such as IL-6 and TNF-alpha, have already been investigated in clinical studies as potential treatments for inflammatory disorders. The review also showed that NF-kB signaling appears to be one of the most important pathways for the anti-inflammatory action of monoterpenes. The NF-kB transcription factor plays

an important role in the progression of inflammation. Following activation of inflammatory processes, NF- κ B induces the expression of many inflammatory genes, including COX-2 and iNOS, which influence the expression of pro-inflammatory cytokines such as TNF- α , IL-1 β , IL-6, and IL-8, key factors in the inflammatory process. In addition, monoterpenes such as linalool, carvacrol, and D-limonene reduce NF- κ B pathways, consequently inhibiting the expression of inflammatory mediators and suppressing the progression of inflammation. In conclusion, the main pharmacological property of the 24 monoterpenes identified is their ability to attenuate the inflammatory response by modulating cytokine production. It is noteworthy that alpha-pinene, a bicyclic monoterpene present in the essential oils of conifers and many other plants, emitted into the forest atmosphere and often dominant compared with other monoterpenes, has a marked anti-inflammatory and antimicrobial profile, suppressing the release of IL-6 and TNF- α in a dose-dependent manner and significantly inhibiting PGE2 production and the expression of COX-2 and iNOS proteins. Other papers also support pharmacological evidence showing that the anti-inflammatory effect is related to the inhibition of TNF- α , IL-1 β , and IL-6 during acute pancreatitis. The key to the anti-inflammatory effect of this monoterpene may be related to ERK and JNK phosphorylation and inhibition of NF- κ B activity. The authors considered the evidence supporting alpha-pinene as a promising anti-inflammatory agent useful in the clinical management of inflammatory diseases to be confirmed.

A recent authoritative study on the nature, functions, and mechanisms of action of Natural Killer (NK) cells, which are part of the innate immune system and serve as a first-line defense against microbial infections and neoplastic degeneration, interpreted the role of forest monoterpenes (MTs) as anti-inflammatory and immunostimulatory agents [10]. Specifically, the study described their direct anti-inflammatory activity through modulation of pro-inflammatory cytokine production; the role of alpha-pinene, synergistically with other MTs, in increasing the number and activity of NK cells, also through gut microbiota homeostasis and the gut-brain axis; and their synergistic action with the reduction in the hormone cortisol, long observed in forest-immersion experiences, because cortisol has an immunosuppressive effect.

CNR-IBE Experience

The Institute of BioEconomy of the National Research Council of Italy (CNR-IBE) conducted a national joint project with the Italian Alpine Club (CAI), with scientific consultancy from the Regional Reference Center for Phytotherapy (CERFIT) at AOU Careggi, Florence, for the development of Forest Therapy. The project had the dual objective of contributing to the scientific knowledge base of the field and of qualifying, between 2021 and 2022, dozens of CAI mountain huts and other sites of interest as Forest Therapy Stations according to rigorous scientific criteria. Through a research collaboration agreement, the same project was extended to other important national institutions in the health sector (Istituto Superiore di Sanita), agro-forestry sector (CREA - Ministry of Agricultural, Food and Forestry Policies), and universities (Sapienza University of Rome, University of Florence, University of Padua, and University of Parma). The project website is: <https://www.reterurale.it/terapiaforestale>.

Forest Therapy sessions consist of short, slow walks that intentionally avoid significant physical effort, along trails immersed in forest environments of particular value. Guided by clinical professionals such as psychologists or psychotherapists qualified by CNR and CAI, the sessions address each participant individually, include frequent stops, and encourage attention to the connection between the senses and the forest environment. The health benefits produced by the forest are mediated by all the senses: sight, hearing, touch, and smell are key senses for producing beneficial effects on human health. In addition to the visual and acoustic appeal of the forest and the absence of human interference, certain forest compositions can release into the air significant amounts of volatile organic compounds (BVOCs, including so-called "terpenes"), especially those most effective for psychological and physiological effects.

Forest Therapy is classified as Complementary Medicine and is included among phytotherapeutic disciplines, for example in the Master's Program in General and Clinical Phytotherapy at the University of Florence, directed by Prof. Fabio Firenzuoli, Director of CERFIT. This has been possible because experimental evidence has allowed significant and important effects of Forest Therapy to be attributed to the prevention and treatment of disorders in both the psychological and physiological domains. Under specific structural, management, and attendance conditions (duration and frequency of experiences),

improvements may be sustained in anxiety, depression, stress, sleep quality, cardiovascular, respiratory, oxidative, and immune parameters.

It has been shown that visiting protected natural areas worldwide, considering only the effects on visitors' mental health, produces economic savings of up to 8% of the GDP of the most industrialized countries, in terms of health expenditure, security, and work productivity [11]. These savings are an order of magnitude higher than tourism revenues and up to one thousand times the budget allocated to agencies responsible for those same protected areas.

The CNR-CAI-CERFIT project, originally developed for qualifying CAI mountain huts and trails, led to several scientific publications:

- An international scientific article published in December 2019, devoted to characterizing the variability and regularities of total VOC concentrations in the forest atmosphere, with original results and interpretations [12].
- An international scientific article published in October 2020, devoted to the restorative effects of viewing and listening to forest videos compared with urban videos during the first COVID-19 lockdown [13].
- The book *Terapia Forestale*, published by CNR Edizioni on December 16, 2020, which received wide national and local media coverage and is freely accessible [14].
- An international scientific article published in September 2021, presenting and discussing results obtained in 2020, involving approximately 200 participants in seven experimental Forest Therapy sessions in forest environments and one control session in an urban park [15].
- The new volume *Terapia Forestale 2*, published in July 2022, which substantially updated and expanded the previous edition [16].
- An international scientific article that, for the first time, based on the database built from the extensive 2021-2022 experimental campaigns (more than 40 sites in mountain, hill, and urban-park contexts), identified exposure to the total concentration of monoterpenes in the forest atmosphere, and specifically to the monoterpene alpha-pinene, as a specific causal factor, independent of any other factor, of significant and dose-dependent effects on the STAI anxiety domain following Forest Therapy sessions lasting approximately 2.5 hours [5].
- An international scientific article identifying personal traits associated with the propensity for voluntary participation in Forest Therapy experiences [17].
- An international scientific article presented at the 3rd World Conference on Forests for Public Health, October 4-7, 2023, Sherbrooke, Canada, which for the first time determined the specific, significant, and dose-dependent effect of cumulative exposure and inhalation of monoterpenes on respiratory functions in adolescents undergoing standard asthma treatment during 14-day medium-altitude stays [18].

The above-mentioned freely accessible publications should be consulted for any further information and details on the nature, meaning, practice, and outcomes of Forest Therapy.

In Tuscany, the project made it possible to qualify several forest sites for suitability for Forest Therapy practice, both in mountain and hilly areas. Among these, the following are particularly relevant:

- The sites qualified within the *FOReste e SALute* project ("FOR.SA", <https://forsa-terapiaforestale.com/>), coordinated by the Associazione Foresta Modello delle Montagne Fiorentine and funded by the Regione Toscana Rural Development Program, whose aim is to enhance the mountain territories of Valdisieve and Valdarno by providing suitable places for "forest therapy" practices.
- The Doganaccia site, Municipality of Abetone Cutigliano (Pistoia), qualified both for Forest Therapy and for pediatric asthma care, where the first health campus "Respiriamo la Montagna Insieme" was successfully conducted from July 13 to July 27, 2025, coordinated by the association *Respiriamo Insieme APS* (<https://respiriamoinsieme.org/>) and in collaboration with the Unione di Comuni Montani Appennino Pistoiese (UCAP, <https://www.ucap.it/>), the Meyer IRCCS University Hospital of Florence, and CNR-IBE.

This study is part of the "Forest Therapy Project as a Broad-Spectrum Tool for Patients With Fibromyalgia," funded by Regione Toscana within the Complementary Medicine program for the 2025-2027 three-year period.

The CNR-IBE persons responsible for the activities of this project described below are:

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Benefits and Risks

The proposed intervention consists of a series of short, slow, and easy walks in environments close to the hospital site, along fully safe routes. It therefore does not involve specific risks, except for those intrinsically and ordinarily related to spending time outdoors in a natural environment.

The expected benefits of the intervention represent the objectives of the study itself: reduction in pain levels and achievement of a better quality of life related to the level of perceived pain.

Rationale and Novelty

The broad spectrum of evidence-supported beneficial effects of immersive practices in forest environments, including effects on inflammatory status and on autoimmune and inflammatory conditions such as psoriasis, psoriatic arthritis, and atopic dermatitis, as well as across the entire spectrum of psychological symptoms, and the determination of at least one specific causal factor identified in the distinctive composition of the forest atmosphere (volatile organic compounds, particularly monoterpenes emitted by plants), represent the fundamental rationale of the project.

Given the limited number of studies on the effects of forest-immersion interventions on the health status of patients with fibromyalgia, and the absence of studies including the atmospheric component as a possible and significant determinant of those effects, this project is particularly original and innovative. The proposed project can make a relevant contribution both scientifically and clinically, with potentially important benefits for both patient health and public health care expenditure.

Control Group (Comparisons)

In all experimental studies in the field of Forest Therapy, as in most clinical trials, it is necessary to compare any observed effects with an adequate control group that is as homogeneous as possible with respect to the intervention group and is characterized as "usual care," in order to determine with sufficient reliability the causality underlying the expected results. The significance and effect size produced in the intervention groups will therefore be determined by comparison with the corresponding control groups.

Study Objectives

Primary Objective

Evaluation of the change in pain using the Visual Analog Scale (VAS) in patients in the intervention groups compared with patients in the corresponding control groups, both during the intervention and during the follow-up period.

Secondary Objectives

- Comparative evaluation of changes in general health parameters and objective health parameters of psychological, functional, and physiological nature, as well as any change in analgesic medication use, in patients in the intervention groups after Forest Therapy interventions compared with control groups.

- Evaluation of the dependence of changes in general health parameters and objective health parameters in patients in the intervention groups after Forest Therapy interventions on environmental variables such as meteorological comfort and monoterpene concentration in the forest atmosphere.
- Evaluation of the dependence of changes in general health parameters and objective health parameters in patients in the intervention groups after Forest Therapy interventions on the "dose" of Forest Therapy (progression and number of interventions and related exposure to monoterpenes in the forest atmosphere).
- Evaluation of the persistence over time of changes in general health parameters and objective health parameters in patients in the intervention groups during the follow-up period, compared with control groups.
- Definition of guidelines and optimization criteria for possible subsequent conversion of Forest Therapy experiences into regular clinical practice for patients with fibromyalgia.

Study Design

The study is structured on the basis of efficacy evidence collected in the scientific literature, including the overall treatment duration required to elicit benefits in patients with fibromyalgia, identified as at least 8 weeks [2] and preferably 12 weeks [1], and the frequency of forest-immersion experiences lasting a few hours, which is related to the persistence of their psychological and physiological effects, estimated at approximately one week [15].

The availability of "usual care" control groups is necessary to estimate the real effects of the treatments [1], whose significance and size will be assessed comparatively. More specifically, each of the two interventions (arm 1) will be compared separately with the corresponding "usual care" control group (arm 2), in order to eliminate potential temporal confounding due to the different periods in which the two planned interventions will be carried out.

Both the control and intervention groups will be randomized according to age (<50 vs. ≥50 years) and baseline VAS score (<60 vs. ≥60 mm), in order to ensure the greatest possible homogeneity between the respective groups.

The study is monocentric, randomized, controlled, and involves another type of intervention (forest therapy). It is a superiority design: according to the research hypothesis, the proposed interventions will provide significant benefits to patients with fibromyalgia compared with the control groups. The purpose of the investigation is noncommercial (non-profit), because it is conducted exclusively by public bodies.

The following project activities and phases are planned:

- A.1. Joint site inspections in the areas where the sessions will take place, namely: the part normally closed to the public of the Tombolo di Cecina Biogenetic Nature Reserve, under the responsibility of the local Reparto Carabinieri Biodiversita Cecina (first-year intervention group); and the Local Protected Natural Area "Giardino Belora, Fiume Cecina," Municipality of Riparbella (Pisa), located 5 km from the sponsor site (Cecina Hospital) (second-year intervention group). The inspections are aimed at precisely defining the routes and the related stops to be used during immersive forest experiences.
- A.2. Preparation of analytical tools: a) sociodemographic questionnaires and specific questionnaires, such as VAS [7], FIQR [3], Widespread Pain Index (WPI) together with the Symptom Severity Scale (SSS) [19,20], trait and state STAI and POMS [4,21], and a patient diary including information on medication use and the VAS itself; b) equipment for non-invasive physiological measurements: systolic and diastolic blood pressure using standard professional sphygmomanometers; heart rate (HR) and heart rate variability (HRV) using Polar H9 or higher wearable chest straps [22,23]; c) procurement and use by CNR-IBE of instruments and materials for measuring atmospheric parameters during each intervention session.
- A.3. Definition of the logistical details of the experimental protocol, which includes Forest Therapy sessions along the routes identified in phase A.1, conducted according to the method previously used in the experimental campaign coordinated by CNR-IBE [5], once weekly for 12 consecutive weeks.

- A.4. Recruitment by the Site Principal Investigator of at least 70 patients with fibromyalgia, in order to obtain sufficient statistical power, to be divided into four groups: two control groups and two intervention groups.
- A.5. Intervention periods: implementation of experimental Forest Therapy sessions, conducted by psychologists/psychotherapists identified by the Sponsor and after theoretical and practical training provided by CNR-IBE, and accompanied by staff from the experimental center for safety purposes (nurses and physicians participating in the study).
- A.6. Administration of the questionnaires referred to in point A.2 and performance of non-invasive physiological measurements (systolic and diastolic blood pressure, heart rate, heart rate variability) on participants in the intervention and control groups, both during the intervention periods and during follow-up for up to 3 months.
- A.7. During each Forest Therapy session, analytical measurements of the quality and bioactive properties of forest air will be performed by CNR: airborne concentrations of volatile pollutants (BTEX) and biogenic volatile organic compounds (BVOCs) by on-site cartridge adsorption and subsequent qualitative-quantitative analysis by thermal desorption and gas chromatography coupled with mass spectrometry (TD-GC-MS) in the laboratory [5,16], at representative points along the routes and at different times during the days of Forest Therapy sessions.
- A.8. Analysis and processing of all data collected during the intervention periods: analytical concentrations of BTEX and BVOCs, questionnaire responses and physiological measurements collected from participants, and meteorological data obtained from publicly available databases. Production of an interim report, one for the first intervention year and one for the second intervention year, within 30 days after the end of the respective intervention periods.
- A.9. A subset of the same questionnaires and physiological measurements will be administered during follow-up periods, up to 3 months after the end of the corresponding intervention period, monthly, to the two groups of patients involved.
- A.10. Preparation of the annual report, one for the first intervention year and one for the second intervention year, based on the preceding activities, ready for delivery approximately within 2 months after the end of the respective follow-up period. Preparation of the final report on the activities carried out during the two intervention years.
- A.11. Preparation and submission of a scientific article to a high-impact and medically relevant journal.
- A.12. Participation in public outreach events in person, jointly agreed upon before, during, and after the experimental period; outreach and dissemination through channels to be jointly agreed upon.

Enrollment Duration, Study Duration, and Presumed Start Date

- Enrollment duration: 4 months in total, that is, a maximum of 2 months in the first year and a maximum of 2 months in the second year.
- Study duration: 24 months.
- Intervention duration: 6 months in total, that is, 3 months for each of the two project years and therefore 3 months for each group. Each subject will participate in the study for 6 months (3 months of intervention and 3 months of follow-up).
- Presumed study start date: September 2025.

Flow Diagram

FIRST STUDY YEAR

SCREENING	RANDOMIZATION 1.3:1	INTERVENTION	CONTROL "usual care"	FOLLOW-UP
N = 35	Stratified by age and baseline VAS	INTERVENTION (1 forest therapy session once weekly for 12 weeks at the Tombolo Reserve) N = 20	Usual care N = 15	Monthly follow-up for 3 months

1 forest therapy
session once weekly
for 12 weeks

No change in normal
habits and activities

Both arms

SECOND STUDY YEAR

SCREENING	RANDOMIZATION 1.3:1	INTERVENTION	CONTROL "usual care"	FOLLOW-UP
N = 35	Stratified by age and baseline VAS	INTERVENTION (1 forest therapy session once weekly for 12 weeks at the Riparbella Protected Area) N = 20	Usual care N = 15	Monthly follow-up for 3 months
		1 forest therapy session once weekly for 12 weeks	No change in normal habits and activities	Both arms

Study Population

The sample size will consist of at least 70 patients with fibromyalgia, to be divided between control groups and intervention groups. Patients will be enrolled from among those followed at the Pain Therapy Outpatient Clinic of Cecina Hospital (UOSD Anesthesia and Resuscitation, Cecina) who have a diagnosis of fibromyalgia. Patients will be contacted directly by the outpatient clinic (see recruitment procedures).

Given the high number of patients attending the Pain Therapy Outpatient Clinic of Cecina Hospital and the preliminary interest shown, the number of eligible patients does not pose risks to the feasibility of the study.

Eligibility Criteria

Inclusion Criteria

- Adult patients of either sex with a diagnosis of fibromyalgia, made by a specialist rheumatologist according to ACR criteria, and attending the UOSD Anesthesia and Resuscitation of Cecina - Pain Therapy Outpatient Clinic, who are being treated with analgesic medications. Patients will be instructed to take the same types of medications from the different pharmacological classes (NSAIDs, opioids, cannabinoids) throughout the study. Daily medications will be recorded by each enrolled patient in a diary, together with daily self-assessment of pain according to the VAS scale.
- Patients without mobility limitations that would prevent slow and easy walks lasting approximately 2.5 hours and covering approximately 2 km, who are willing to self-certify their capacity to walk without assistance in an obstacle-free environment.
- Signing of the informed consent form, which includes explicit information on the characteristics of the route and the risk of accidental falls.

Exclusion Criteria

- Patients who have not been diagnosed with fibromyalgia.
- Patients with diagnosed neoplastic diseases.
- Pregnancy.
- Diagnosed allergies to pollens and/or grasses and/or insect stings.
- Systemic, degenerative neurological, or infectious diseases in the active phase.

Interventions

Intervention (Forest Therapy) - INTERVENTION GROUPS

The intervention will consist of administering Forest Therapy sessions to participants.

In the first year, Forest Therapy sessions will take place in the part normally closed to the public of the Tombolo di Cecina Biogenetic Nature Reserve, under the responsibility of the local Reparto Carabinieri Biodiversita Cecina: <https://rgpbio.it/riserva/tombolo-di-cecina/>.

In the second year, the intervention setting will be the Local Protected Natural Area "Giardino Belora, Fiume Cecina," Municipality of Riparbella (Pisa), approximately 5 km from the Coordinating Center site (Cecina Hospital), described at <https://www.parks.it/anp.giardino.belora.cecina/map.php>.

Forest Therapy sessions will consist of short, slow walks, intentionally without significant physical effort, along safe and easy routes corresponding to the lowest "Tourist" level of the trail-difficulty scale adopted by the Italian Alpine Club, immersed in forest environments of particular value. Guided by clinical professionals such as physicians, psychologists, or psychotherapists affiliated with the UOSD Anesthesia and Resuscitation of Cecina, the sessions are addressed individually to each participant, include frequent stops, and encourage focus on the connection of the senses with the forest environment. The method for conducting Forest Therapy sessions is described in detail in Chapter 3.2 of the volume *Terapia Forestale 2* and is reproduced below with minimal adaptations to the experimental protocol [16].

1. Meeting at the designated meeting point with participants, physician, psychologist, and operators.
2. Introduction of the Psychologist and planned activities - 5 minutes.
3. Administration of STAI and POMS tests and preliminary physiological measurements (instructions and completion) - 30 minutes.
4. Start of activity: request to turn off phones and minimize verbal exchanges.
 - Slow walk - 5 minutes.
 - Visual perception (around a point) - 15 minutes.
 - Slow walk - 5 minutes.
 - Auditory perception (around a point) - 15 minutes.
 - Slow walk - 5 minutes.
 - Tactile perception (around a point) - 15 minutes.
 - Slow walk - 5 minutes.
 - Olfactory perception (around a point) - 15 minutes.
 - Slow walk - 5 minutes.
 - Perceptual and movement activity chosen freely by the participants - 20 minutes.
1. Walk back to the starting/arrival point - 20 minutes. Administration of STAI-S and POMS tests and final physiological measurements - 30 minutes, when planned.

The psychologist will instruct participants to follow the method for conducting the session and stimulate attention through the specific senses, as well as promptly identify, and resolve with the support of the operators, any critical issues.

Intervention Schedule

Forest Therapy sessions at each identified route will be administered once weekly for 12 consecutive weeks, indicatively on Friday or Saturday.

Control ("usual care") - CONTROL GROUPS

The control groups will consist of a cohort of patients with fibromyalgia randomized, like the intervention groups, according to the following stratification factors: age (<50 vs. ≥50 years) and baseline VAS score

(<60 vs. ≥60 mm), in order to ensure the greatest possible homogeneity with the intervention groups. The same measurements planned for participants in the intervention groups will be performed on them. Compared with the intervention group, participants will not be asked to modify their normal habits or activities.

Adherence to the Intervention

All enrolled patients, belonging to both the intervention and control groups, will be thoroughly informed of the need to adhere to the experimental protocol.

In particular, patients in the intervention groups will be encouraged to participate in all sessions. Adherence will be monitored through physical attendance at those sessions. These patients, who will be explicitly informed of the route characteristics, will be advised to wear suitable clothing and footwear for short walks.

Patients will be required to self-certify their ability to walk without assistance using a dedicated form compliant with Articles 46 and 47 of Presidential Decree 445/2000.

The Forest Therapy intervention entails a specific and periodic commitment (travel, punctuality, and availability for several hours, repeated 12 times, once weekly), and therefore a higher dropout rate is expected compared with the control groups, who are not required to modify their normal habits or activities.

Because a certain number of patients, especially those in the intervention groups, may withdraw, up to 20% of the total (family commitments, discomfort with the forest environment, and other causes), enrollment of at least 70 patients in total will be pursued, divided between intervention groups (40 over two years, 20+20) and control groups (30 over two years, 15+15). Some patients may not participate, for various reasons, in one or more sessions; this possibility will be considered and managed during statistical analysis of the collected data.

Concomitant and Supportive Therapies

Participants in both the intervention and control groups will continue the normal analgesic treatments related to their condition.

Prohibited Therapies

During the study, patients will follow the normal therapeutic treatments specific to their condition. The proposed intervention does not prohibit any additional treatments.

Each enrolled patient must record the therapies taken daily in a personal diary ("patient diary").

Assessment of the Potential Benefit/Risk Ratio for the Population

No specific risks are expected for the population (intervention and control groups) deriving from the treatment, except for the normal potential risks associated with slow walking, guided by a psychologist and a health technical operator, along easy trails in a wooded environment, with "Tourist" difficulty level (routes on cart tracks, mule tracks, or clear trails that do not pose orientation uncertainties or problems, with modest slopes and limited elevation gain; <https://www.cai.it/organizzazione/organismi-centrali/commissione-centrale-escursionismo-e-cicloescursionismo/>). These are activities that any person with normal motor abilities can easily perform at any time.

Direct benefits are expected for patients assigned to the intervention groups, according to the rationale and research hypotheses: reduction of pain and improvement of general health, including psychological health.

Withdrawal of Subjects and Changes to the Intervention

Participation in the study of each individual subject will be permanently discontinued in the following cases:

- Withdrawal of consent by the participant.
- For participants in the intervention groups, reduction in motor ability or worsening of disease symptoms such as to make participation in Forest Therapy sessions impracticable, according to the judgment of the physicians involved in the trial.
- For participants in the intervention groups, discomfort arising from attendance in the wooded environment, based on the judgment of the psychologist.

Early Termination or Suspension of the Study

The study may be interrupted at any time by the Sponsor, with prompt notification to the investigators and ethics committees. In this case, patients in the intervention groups will continue to be followed according to normal clinical practice.

Definition of Study Completion

The study will be completed for each individual patient at the end of the follow-up period.

In the event of withdrawal, the study for the individual patient will end at the time of withdrawal, without any contraindication or need for additional therapies compared with normal clinical practice.

The study as a whole will be completed with the last follow-up visit of the last enrolled patient.

Study Endpoints

Primary Endpoint

- Measurement of change in pain assessed by the Visual Analog Scale (VAS), a gold-standard measure validated for fibromyalgia that allows direct and comparable measurement. The Italian version of the VAS is available in the literature and clinical databases (e.g., PROQOLID, SIR guidelines), and its use is well established in fibromyalgia [7,24].

Secondary Endpoints

- Change in the Revised Fibromyalgia Impact Questionnaire (FIQR) score.
- Change in the Widespread Pain Index (WPI) + Symptom Severity Scale (SSS) score.
- Change in the State-Trait Anxiety Inventory (STAI) score, both state (STAI-S) and trait (STAI-T).
- Change in the Profile of Mood States (POMS) score.
- Change in systolic and diastolic blood pressure.
- Change in heart rate (HR).
- Change in heart rate variability (HRV).
- Any change in medication use at the end of the study (intervention groups vs. control groups).
- Dependence of changes in the above scores and parameters on environmental variables (meteorological comfort, volatile organic pollutants, and biogenic volatile organic compounds), assessed during Forest Therapy sessions only for the intervention groups.

Study Planning

Study Timeline

Enrollment and Group Assignment

All interested patients will be individually invited to attend the Pain Therapy Outpatient Clinic of Cecina Hospital, where, in addition to signing the consent form and the documents required to participate in the study, they will be invited to complete the sociodemographic questionnaire, the STAI TRAIT test (STAI-T), and the FIQR and WPI+SSS questionnaires. On that occasion, each participant will receive the "patient diary," where they will record daily, throughout the entire period (3 months intervention + 3 months follow-up), the medications taken and the VAS score.

Before group assignment, each patient will complete the patient diary for 7 consecutive days, specifically for reconstructing the baseline VAS as the arithmetic mean of the reported daily levels.

Self-assessment of pain level by means of the VAS, as well as other methods, is subject to important recall-bias problems, to the extent that day-by-day completion is generally recommended [31]. This explains the choice to require daily completion of the patient diary, particularly the VAS scale.

Based on age and baseline VAS, participants will be assigned to the intervention and control groups, and the appointment dates will be communicated to participants.

INTERVENTION PERIOD

Intervention groups:

During each Forest Therapy session, participants in the intervention groups will be asked to complete the FIQR and WPI+SSS questionnaires (before the session), and the psychometric POMS and STAI-S questionnaires (before and after the session).

At the first Forest Therapy session and then once monthly, physiological parameters will also be measured (before and after the corresponding session).

Every day, participants in the intervention groups will complete the patient diary.

Control groups:

At the time of the first Forest Therapy session performed by the intervention group and then once monthly, participants will be invited to the outpatient clinic for physiological parameter measurements and completion of the FIQR and WPI+SSS questionnaires.

Every day, participants in the control groups will complete the patient diary.

FOLLOW-UP PERIOD

All study participants (intervention groups and control groups) will be invited to attend the outpatient clinic once monthly for physiological parameter measurements and completion of the FIQR and WPI+SSS questionnaires.

Every day, all study participants will complete the patient diary.

During the final visit, all study participants will also be asked to complete the STAI TRAIT questionnaire and return the "patient diary."

Procedure/Assessment	Enrollment	Intervention group (weekly for 12 weeks)	Control group (monthly for 12 weeks)	Follow-up (1, 2 and 3 months after intervention)
Inclusion/exclusion criteria	X			
Informed consent, data	X			

Procedure/Assessment	Enrollment	Intervention group (weekly for 12 weeks)	Control group (monthly for 12 weeks)	Follow-up (1, 2 and 3 months after intervention)
processing consent, and self-certification of walking capacity				
Sociodemographic and personal information, STAI-T, baseline VAS test	X			
Randomization	X			
FIQR and WPI+SSS questionnaires	X	X	X	X
STAI-S and POMS questionnaires (pre/post)		X		
Diary with analgesic medication use and VAS	X	X	X	X
Physiological parameters		X (monthly)	X	X
STAI-T questionnaire	X			X (at end of follow-up)

Sample Size

The overall sample size is at least 70 patients participating in the study, to be divided between two intervention groups and two control groups. This sample size was assessed on the basis of the scientific literature (e.g., [25]) and the experience of the participating Center (e.g., [5]), in order to reach the statistical power required at the end of the study, also considering the multiple confounding variables for this type of trial.

The sample size was calculated by power analysis (G*Power 3.1), assuming an effect size $d = 0.5$ (moderate) for the change in pain (VAS scale), significance $\alpha = 0.05$, and power $1 - \beta = 0.80$. The minimum required sample is 64 patients. Allocating 20+20 patients to each of the two intervention groups and 15+15 to each of the two "usual care" control groups (ratio 1.33:1), and considering a 20% dropout rate, a total sample of 70 patients ensures adequate power [26].

Screening Phase

Patients who meet the enrollment criteria and wish to participate in the study will be informed about the possibility of participating in the study.

Enrollment Procedure

Considering the above-described "Eligibility Criteria" (inclusion and exclusion), the recruitment strategy will consist of direct communication by the Center to patients attending the UOSD Anesthesia and Resuscitation - Pain Therapy Outpatient Clinic of Cecina who are eligible for the study.

More specifically, patients will be contacted using the following means:

- Email.
- Mobile messaging.
- Direct phone calls.

Interested persons will be individually called to a meeting at which formal acceptance of participation in the study will be completed.

This approach is considered fully adequate for recruiting a number of participants sufficient for the needs of the study.

Assignment of the Intervention

At the beginning of the study, each participant will be assigned an alphanumeric code, unique to each participant and personally drawn by the participant from an opaque box. From that moment onward, each patient will be identified, for study purposes, only by that alphanumeric code, which will never be requested or disclosed throughout the entire duration of the study.

After assignment of the alphanumeric code, each participant will complete a questionnaire designed to collect sociodemographic information and personal characteristics. During the following 7 consecutive days, each participant will also complete the patient diary, with the specific aim of assessing baseline disease levels using the VAS. The baseline VAS score will be evaluated as the arithmetic mean of the scores for those 7 consecutive days, and intervention assignment will take place within 5 days after completion of those diaries.

For allocation to an intervention group and a control group, the Stratified Block Randomization procedure will be applied, which is suitable for small samples [27-29], with variable block sizes (6 or 4) and stratification by age ($<50/\geq 50$ years) and baseline VAS ($<60/\geq 60$ mm). Allocation will be generated electronically (R software or Python language) to ensure concealment. The dataset and the Stratified Block Randomization algorithm, in R and/or Python, will be made available to CEAVNO before the start of the trial.

The allocation ratio between intervention groups and control groups will be 1.33:1, adopted to compensate for the higher expected dropout in the intervention group (20% vs. 10% in the control group), in line with methodological recommendations for trials involving interventions with high logistical complexity [30]. This approach ensures that, even after withdrawals, the final sample size maintains adequate statistical power to detect clinically relevant differences. The CONSORT 2025 guidelines will be followed in reporting [29].

Each participant in the intervention groups will be informed of the session schedule at the time of assignment of the personal alphanumeric code, so as to allow an adequate period for organizing their activities during the weeks of the trial.

No anonymization of health care professionals or any other study executor is planned.

The study staff responsible for generating the allocation sequence, enrolling participants, and assigning them to each intervention group is the Site Principal Investigator, Dr. Ubaldo Riccucci.

Other Study Procedures

No additional procedures are planned beyond those described above.

Data Management

Data Collection

The data collected from patients are as follows:

1. Sociodemographic and personal information: gender, age, height and weight, occupation, educational qualification, residential environment (type of settlement, presence of green areas, etc.), smoking habits, frequency of sports activities, dietary habits, allergies, etc. Sociodemographic data will be collected using a specifically prepared questionnaire.
2. Data on pain intensity, using the VAS scale [7].
3. Data on disease impact over the previous 7 days (activities, functions), using the Revised Fibromyalgia Impact Questionnaire, FIQR [3], which includes 21 questions with a 0-to-10 rating scale.

4. Data on pain location and intensity over the previous 7 days, using the Widespread Pain Index [19,20], which includes 27 items to assess the body distribution of pain in 19 sites and to quantify the degree of widespread bodily pain and centralized pain characteristics (for example, cognitive, emotional, and physical symptoms). It consists of two scales: one assessing pain distribution from focal to widespread (WPI), and the other assessing the presence and severity of symptoms associated with centralized pain (SSS scale).
5. Data on psychological conditions with particular reference to mood, anxiety, and stress, using two self-assessment questionnaires selected from those most commonly used and cited in the scientific literature on Forest Therapy: State-Trait Anxiety Inventory (STAI) [4], which includes 20 items for assessing trait anxiety and 20 for state anxiety, rated on a 4-point scale; and Profile of Mood States (POMS) [21], consisting of 40 questions on mood states perceived at a specific moment, rated on a 5-point scale.
6. Data on analgesic medication use ("patient diary").
7. Vital parameters: systolic and diastolic blood pressure, heart rate (HR), heart rate variability (HRV), and saturation (Sat O₂). Parameters will be collected through non-invasive measurements, using standard professional sphygmomanometers (blood pressure), pulse oximeters, and Polar H9 or higher wearable chest straps [22,23] (HR and HRV).

In addition, environmental variables will be collected during each session (by CNR-IBE), with the aim of assessing meteorological comfort and the concentration of volatile organic pollutants and biogenic volatile organic compounds.

Timing

Data collection at ENROLLMENT:

Signing of the consent form and the forms required to participate in the study; sociodemographic questionnaire; STAI TRAIT test (STAI-T); and FIQR and WPI+SSS questionnaires.

Data related to the reconstruction of baseline VAS (patient diary for 7 consecutive days).

Data collection during the INTERVENTION period:

Intervention groups: FIQR and WPI+SSS questionnaires (before each session); POMS and STAI-S psychometric questionnaires (before and after each session). Physiological parameters before and after one Forest Therapy session, once monthly.

Control groups: once monthly, physiological parameters and FIQR and WPI+SSS questionnaires.

Data collection during the FOLLOW-UP period: once monthly, physiological parameters and FIQR and WPI+SSS questionnaires. At the end of the follow-up period: STAI TRAIT questionnaire. At the end of the follow-up period: collection of the "patient diary" (medications taken and daily VAS scale for the entire experimental period).

Data Analysis

For the data relating to each group, the change/evolution of the considered parameters (general psychological, functional, and physiological health) will be analyzed during the intervention period and during the follow-up period. As specified in the "Study Design" section, each of the two interventions (arm 1) will be compared separately with the corresponding "usual care" control group (arm 2).

The results obtained from the intervention groups will then be compared with those of the control groups to assess any differential change in the considered parameters after Forest Therapy interventions. Data from the follow-up period will also be compared to assess the persistence over time of changes in health parameters in patients in the intervention groups during follow-up, compared with control groups.

For the intervention groups only, the possible dependence of changes in health parameters on selected environmental variables will be analyzed, including meteorological comfort, the level of volatile organic

pollutants, and the concentration of biogenic volatile organic compounds (monoterpenes) in the forest atmosphere.

Changes in parameters at different phases of the intervention will also be analyzed to assess possible dependencies of the effects on the "dose" of Forest Therapy (number of interventions).

Analysis Tools

Data will be collected on paper case report forms.

Statistical analyses will be performed using RStudio software or the Python language.

Data Handling

Data related to points 1-5 will be administered on paper, using the indicated self-assessment questionnaires.

Paper questionnaires will be administered directly by Center staff. Once completed, the questionnaires will be placed independently by the individual participants in a closed box, which will then be transported to the Center, where the data will subsequently be processed jointly with CNR-IBE.

Data will be processed according to current privacy regulations and in line with Good Clinical Practice. Data will be stored by the investigators in pseudonymized form, assigning a progressive alphanumeric code to each record; the decoding list for the codes will be kept under the responsibility of the Principal Investigator.

Data Storage

Study-subject data will be confidential and used in accordance with current legislation on sensitive data protection and privacy. The Principal Investigator will process the personal data of participating subjects exclusively for the purposes of carrying out the trial. The Principal Investigator is the Data Controller pursuant to and for the purposes of GDPR 679/2016. Study data will be stored under the responsibility of the Principal Investigator for 7 years after study completion.

The person responsible for the data, the pseudonymization measures, and the codes for opening pseudonymization is the Principal Investigator, Dr. Ubaldo Riccucci.

Protocol Deviations

The only possible deviation from the experimental protocol concerns the possible cancellation of one or more experimental Forest Therapy sessions in the event of adverse weather conditions for a period of time that prevents the same session from being held within 2 days (before or after) the established weekday, indicatively Friday or Saturday. At most one cancelled session may be recovered at the end of the intervention period, in which case the study period will be extended by one week.

Statistical Plan

Data will be analyzed using:

- Mixed Models for Repeated Measures (MMRM) for the primary endpoint (VAS), with fixed effects (group, time, interaction) and random effect (subject) [32,33].
- Bonferroni-Holm correction for multiple comparisons on secondary endpoints.
- Multiple imputation (m = 5 datasets) for missing-at-random data; sensitivity analysis (last observation carried forward + worst-case) for high dropout rates.

Normality (Shapiro-Wilk test) and homoscedasticity (Levene test) will be assessed. In case of normality, Student t tests and Fisher F tests will be used; in case of violation of normality, non-parametric tests will

be used (Friedman for repeated measures, Wilcoxon/Mann-Whitney for between-group comparisons, Brown-Forsythe for variance).

Administrative Aspects

Study Funding

The "Forest Therapy Project as a Broad-Spectrum Tool for Patients With Fibromyalgia" was funded on the basis of Regione Toscana Regional Council Resolution no. 151 of 17/02/2025, Regione Toscana - Annex A - Annex B, for EUR 10,000 each year for three years (for the first two project years, the funding will be used for this study, while in the third year the funding will be aimed at scientific dissemination of the results).

Insurance Coverage

The intervention proposed by the study presents only very limited additional risks for subjects compared with normal clinical practice, namely those intrinsically and ordinarily related to spending time outdoors in a natural environment; it can therefore be classified as a low-intervention trial. The Sponsor, Azienda USL Toscana Nord Ovest, has provided for appropriate insurance coverage for any risks related to the trial.

Ethical Considerations

The study will be conducted in accordance with current regulations on clinical trials and with the Declaration of Helsinki, and the opinion of the competent Ethics Committee will be requested (Comitato Etico Regione Toscana Area Vasta Nord Ovest, CEAVNO).

Obtaining Informed Consent

During recruitment (point A.4 of the "Study Design"), the Principal Investigator of the Experimental Center will inform each participant about the purposes of the Study. For this purpose, a document containing all information useful for participants to evaluate their participation in the Study will be prepared, and the informed consent form for enrolled subjects will be collected before any other action is taken. Attached to the informed consent will be a self-declaration of the capacity to walk without assistance, compliant with Articles 46 and 47 of Presidential Decree 445/2000.

The patient's autonomy in deciding whether or not to participate in the study will be respected. Participation in the study, or refusal by the patient, will not in any way affect the care received. The patient may withdraw consent at any time without providing any explanation.

No discrimination will be made in including or excluding patients on the basis of sex, ethnicity, religious or political beliefs, sexual behavior, or ethical values.

The researchers involved in the study undertake to ensure that data analysis is performed rigorously and that the topics addressed are relevant to patient health and the advancement of knowledge.

Data processing will take place in accordance with Regulation (EU) 2016/679 (GDPR).

Conflict of Interest

The investigators declare the absence of any financial interest and any conflict of interest.

Responsibilities and Publication Policies

Role of the Sponsor, Investigators, and Project Partners

The Sponsor and the Principal Investigator will be primarily responsible for the following:

- Identification and performance of site inspections, with the support of CNR-IBE, of the forest routes to be studied.
- Recruitment of patients participating in the trial.
- Recruitment of psychologists and accompanying personnel.
- Conduct of the experimental Forest Therapy sessions, with the support of CNR-IBE.
- Performance of clinical measurements on the participants in the trial.
- Data analysis and preparation of scientific articles on the results, jointly with CNR-IBE.
- Data storage.
- Participation with CNR-IBE in outreach events.

CNR-IBE will be primarily responsible for the following:

- Identification and performance of site inspections, with the support of the PI, of the forest routes to be studied.
- Preparation of analytical instruments and materials for measuring atmospheric parameters during each intervention session.
- Preparation of the questionnaires (FIQR, trait and state STAI, and POMS) to be administered in the various phases of the trial.
- Theoretical and practical training for psychologists/psychotherapists involved in the study.
- Performance of environmental measurements in the forest atmosphere (volatile pollutants and biogenic volatile organic compounds: BTEX, BVOCs) during the experimental sessions and subsequent qualitative-quantitative analysis.
- Collection of meteorological data.
- Processing and analysis of data, with support from the Sponsor for clinical data.
- Reporting and coordination of scientific publications.
- Participation together with the Sponsor in outreach events and dissemination through channels to be jointly agreed upon.

Data Ownership

The data are owned by the Sponsor. For the purposes of carrying out the study, the Sponsor will share the data with CNR-IBE solely for research purposes (analysis, reports, scientific publications).

The staff will have access to all final study data at the end of the study period.

Publication Policies

Within 2 months after the end of the second year of the study, and if possible already after the first year of the study, one or more scientific articles will be submitted to high-impact international journals of medical relevance, jointly produced by the Coordinating Center and CNR-IBE. At least one public conference in the Sponsor's area and participation in at least one international conference of medical relevance are also planned. More outreach-oriented articles for the specialized press are also planned, including on the basis of a national joint Press Release by CNR and the Experimental Center, in agreement with the Sponsor, to be produced after publication of the first scientific article in an international journal.

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