FEMTEC

DRAFT TECHNICAL INPUT AND TRAINING MATERIAL

Hydrotherapy and Balneotherapy Foundations for Safe, Evidence-Informed Clinical Practice

Training package for adaptation to national and professional contexts

World Federation of Hydrotherapy and Climatotherapy (FEMTEC)
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1. Purpose, audience and use of this training material

This training material responds to the agreed FEMTEC–WHO collaboration activity to provide technical input and develop training materials on Hydro/Balneotherapy for WHO consideration. It adapts and modernizes FEMTEC educational source material originally organized as "Basics in Balneology, Physical and Rehabilitation Medicine for Students in Medicine", while incorporating current evidence and WHO principles on competency-based rehabilitation education, quality, safety, regulation and evidence-informed integration [1–3].

The intended audience is physicians and other regulated health professionals involved in rehabilitation, physical medicine, medical hydrology, balneology or supervised aquatic therapy. Sections may also support undergraduate teaching where appropriate. The package is deliberately modular: countries and institutions may adapt depth, sequence, teaching methods and assessment to their legal framework and workforce needs. It does not establish a universal minimum number of training hours and does not authorize independent practice.

1.1 Core competencies addressed

- Use internationally understandable terminology and distinguish hydrotherapy, balneotherapy, aquatic therapy, peloid therapy and health-resort medicine.
- Understand the physical and thermal properties of water relevant to clinical rehabilitation.
- Describe major natural therapeutic resources and the need for physicochemical and microbiological characterization.
- Assess indications, treatment goals, contraindications, precautions and patient-specific risk.
- Select and document treatment parameters and co-interventions within professional scope.
- Interpret current evidence without overstating certainty or generalizing across distinct interventions.
- Recognize adverse events and apply appropriate monitoring, emergency and referral procedures.
- Apply quality, hygiene, environmental and clinical-governance principles in therapeutic facilities.
- Use outcome measures and clinical documentation to support continuity, evaluation and quality improvement.
- Communicate clearly with patients and multidisciplinary teams and distinguish medical treatment from wellness use.

2. Terminology and scope of practice

International terminology in this field has historically been inconsistent. A useful conceptual distinction is that hydrotherapy refers to therapeutic use of plain water and the aquatic environment, while balneotherapy generally refers to therapeutic use of natural mineral and/or thermal waters and, in many traditions, other natural therapeutic resources such as peloids and gases. Health-resort medicine is broader and may combine balneotherapy, hydrotherapy, climatotherapy, rehabilitation, exercise, education and other medical interventions [4].

Term	Working definition for this package	Training note
Hydrotherapy / aquatic therapy	Therapeutic use of water and/or exercise in water; the water need not be mineral or naturally thermal.	Specify whether the intervention is passive immersion, active aquatic exercise, or another technique.
Balneotherapy	Therapeutic use of natural mineral and/or thermal water, usually as part of medically supervised treatment.	Describe the water/resource and treatment parameters; avoid using the term as a synonym for all aquatic therapy.
Peloid therapy	Therapeutic application of natural or processed peloids (e.g., muds) by defined methods.	Characterize the peloid and method; distinguish mud pack, mud bath and other applications.

Term	Working definition for this package	Training note
Climatotherapy	Therapeutic use of defined climatic factors within a clinical programme.	Relevant to balneoclimatic medicine but not automatically part of every hydro/balneotherapy intervention.
Spa / health-resort therapy	A multimodal programme that may combine natural therapeutic factors, rehabilitation, exercise, education and medical care.	When interpreting evidence, identify which components were actually delivered.

3. Therapeutic resources and the aquatic environment

3.1 Physical properties relevant to rehabilitation

Water changes the mechanical and physiological environment in which movement occurs. Buoyancy reduces effective weight-bearing; viscosity and drag provide graded resistance; hydrostatic pressure and immersion depth alter fluid distribution and cardiorespiratory loading; and water temperature affects thermal balance, vascular tone and perceived comfort. Whole-body or head-out immersion can produce substantial cardiovascular, endocrine, renal and respiratory responses, which is why depth, temperature and patient health status matter clinically [5–7].

- Buoyancy: may reduce joint loading and facilitate movement, transfers and gait practice.
- Viscosity and drag: resistance rises with movement speed and surface area, allowing exercise intensity to be graded.
- Hydrostatic pressure and immersion: influence venous return, central blood volume and respiratory mechanics; these effects are clinically relevant in susceptible patients.
- Thermal transfer: water conducts heat efficiently; both hot and cold exposure can become a safety issue if dose is excessive or thermoregulation is impaired.
- Psychological and contextual effects: confidence, relaxation, social interaction and expectations may contribute to observed outcomes and should be distinguished from specific physicochemical effects.

3.2 Natural mineral and thermal waters

Natural mineral and thermal waters vary markedly in temperature, total mineralization and ionic or gaseous composition. Classification systems and legal definitions differ between jurisdictions; therefore this package does not impose a universal mineral-water classification. In clinical and research documentation, the resource should be described sufficiently to allow interpretation and replication.

- source/location and regulatory classification where applicable;
- temperature at source and temperature at application;
- total mineralization and major ions/components relevant to the intervention;
- relevant gases or potentially bioactive components (for example sulfur species) where applicable;
- microbiological quality and facility water-management procedures;
- route of use: bathing/immersion, inhalation, drinking cure or other locally authorized route.

3.3 Peloids and other natural therapeutic factors

Peloids are used in several balneological traditions as local or whole-body applications. Their effects may involve combined thermal, mechanical and physicochemical components. For training and research, the material, maturation/processing where relevant, temperature, application thickness or area, duration and frequency should be documented. The same principle applies to other natural therapeutic resources: the resource and the exposure must be characterized rather than assumed to be interchangeable.

4. Patient assessment and clinical decision-making

A safe prescription begins with the clinical problem and functional goal, not with the availability of a spring, pool or procedure. Learners should be able to connect diagnosis, functioning, comorbidity, patient preference and rehabilitation goals to a specific intervention. The assessment should be compatible with the ICF-oriented and person-centred approach commonly used in rehabilitation.

4.1 Minimum pre-treatment assessment

- primary diagnosis and relevant differential or red-flag considerations;
- pain, mobility, balance, endurance and functional limitations relevant to the proposed treatment;
- cardiovascular and respiratory stability, including symptoms suggesting limited tolerance of immersion or heat;
- skin integrity, active infection and communicable-disease considerations;
- neurological status, cognition, seizure history and ability to follow safety instructions;
- falls risk, transfer ability and need for assistance entering or leaving the pool/bath;
- thermoregulatory risk, frailty, multimorbidity and medication factors in older adults;
- patient goals, preferences, previous experience and expected adherence.

4.2 Contraindications and precautions

A single universal contraindication list is inappropriate because risk depends on intervention type, temperature, immersion depth, duration, facility, comorbidity and supervision. Training should therefore teach risk stratification. Examples requiring individualized medical assessment include unstable cardiovascular or respiratory disease, acute infection, uncontrolled fever, significant open or infected skin lesions, impaired consciousness, uncontrolled seizure risk, severe haemodynamic instability, inability to enter or exit safely, and clinically important intolerance to heat or immersion. Local regulations and specialty guidance take precedence.

5. Treatment modalities and prescription parameters

5.1 Common modalities

Modality	Training description
Passive immersion / bath	Individual or group immersion with defined water type, depth, temperature and duration.
Aquatic therapeutic exercise / hydrokinetotherapy	Active movement, strengthening, endurance, balance, gait or mobility training in water.
Pool-based rehabilitation	Structured rehabilitation combining aquatic exercise with functional goals and progression criteria.
Peloid applications	Local packs, partial applications or other defined methods; treatment parameters and material characterization are required.
Alternating or contrast procedures	Thermal exposure using defined warm/cool phases where clinically appropriate and locally accepted.
Inhalation / drinking cures	Used in some medical-hydrology traditions; require separate indication, safety, resource-quality and regulatory considerations.

5.2 Prescription parameters to document

- therapeutic goal and target outcome;
- intervention and resource used;
- water temperature and, where relevant, immersion depth;
- session duration and frequency;
- total planned treatment course;
- exercise type, intensity, repetitions or progression criteria for active therapy;
- co-interventions (exercise, education, medication, physiotherapy, peloids, etc.);
- required supervision or assistance;
- monitoring parameters and stop criteria;
- outcome measure and review point.

6. Evidence-informed indications and communication of uncertainty

Recent evidence most consistently concerns musculoskeletal disorders, especially osteoarthritis, chronic low back pain and fibromyalgia. There is also condition-specific evidence in chronic venous insufficiency and selected dermatological conditions. Nevertheless, the overall certainty varies. A 2025 systematic review and meta-analysis of 42 randomized balneotherapy trials in rheumatology found favourable pooled estimates for pain and quality of life but graded the certainty of those effects as very low because of risk of bias, inconsistency and publication-bias concerns [10].

Clinical area	What recent evidence suggests	Training message
Osteoarthritis	Systematic reviews generally report improvement in pain/function with thermal mineral-water balneotherapy; a 2024 hydrotherapy meta-analysis also reported short-term benefit in knee OA [11,12].	Reasonable adjunct in selected patients; do not present as disease-modifying therapy or as uniformly high-certainty evidence.
Chronic low back pain	A 2022 randomized trial found therapeutic aquatic exercise superior to physical-therapy modalities for several outcomes through 12 months [13].	Aquatic exercise evidence should not automatically be attributed to mineral-water balneotherapy.
Fibromyalgia	A 2024 meta-analysis reported improvement in pain and disability after balneotherapy, with persistence at follow-up for some outcomes [14].	Use within multimodal, individualized management; acknowledge heterogeneity and multifactorial effects.
Chronic venous insufficiency	A 2023 Cochrane review found a small probable improvement in disease severity versus no treatment, with lower-certainty evidence for several other outcomes [15].	Evidence is condition- and comparator-specific; assess vascular status and safety.
Dermatology	A 2024 systematic review reported improvements mainly in psoriasis but judged the evidence base limited and often low quality [16].	Dermatological use should be diagnosis-specific and coordinated with appropriate specialist care.

7. Safety, adverse events and emergency preparedness

Available randomized evidence does not demonstrate a consistent excess of adverse events with medically supervised hydrotherapy or balneotherapy, but reporting is incomplete. In the 2025 rheumatology review, only 5 of 42 trials contributed adverse-event data and only 2 contributed serious-adverse-event data [10]. Training must therefore

treat safety surveillance as an active clinical responsibility rather than infer safety from the absence of reported harms.

7.1 Potential adverse events and operational hazards

- dizziness, presyncope, hypotensive symptoms or intolerance during/after heat or immersion;
- fatigue, dyspnoea, chest discomfort or unusual cardiovascular symptoms;
- thermal discomfort, overheating or excessive cooling;
- transient exacerbation of pain or musculoskeletal symptoms;
- skin irritation or individual reaction to a resource or product;
- slips, falls, unsafe transfers or difficulty exiting the pool/bath;
- infection-control or water-quality incidents;
- adverse events related to exercise intensity or a co-intervention rather than to water itself.

7.2 Monitoring and stop criteria

- establish baseline status appropriate to patient risk and planned exposure;
- observe symptoms and functional tolerance throughout the session;
- use physiological monitoring when clinically indicated by diagnosis, comorbidity or treatment intensity;
- stop treatment for acute chest pain, marked dyspnoea, syncope/presyncope, acute neurological change, severe distress, signs of significant allergic reaction or other concerning clinical deterioration;
- ensure a clear escalation pathway, first-aid capability and emergency access appropriate to the facility.

7.3 Adverse-event documentation

For both clinical governance and research, training should include a standardized record of:

- event description and timing;
- severity;
- relationship to the intervention (suspected, possible, unlikely, unrelated);
- action taken;
- whether treatment was stopped or modified;
- clinical outcome and follow-up;
- whether the event meets local criteria for formal reporting.

8. Facility quality, hygiene and clinical governance

The source material correctly emphasized hygiene and facility conditions. In a modern training package, these should be framed as clinical-governance requirements rather than as a fixed universal technical standard. Water microbiology, disinfection where applicable, maintenance, resource handling, ventilation, accessibility, transfer equipment and emergency systems must comply with national and local requirements. Natural therapeutic resources that are not managed in the same way as conventional pools require resource-specific quality procedures.

- written procedures for water/resource quality monitoring and response to non-conformity;
- infection-prevention and cleaning protocols;
- defined responsibilities for clinical and technical staff;
- safe access, handrails, transfer systems and fall prevention;
- temperature control and calibrated measurement;
- appropriate privacy and communication procedures;
- emergency equipment, staff training and rehearsed response pathways;
- incident reporting and regular quality review.

9. Integration with rehabilitation, exercise and patient education

The original FEMTEC material strongly emphasized the relationship between balneology, physical and rehabilitation medicine, exercise and healthy ageing. This remains a useful educational principle when updated: hydro/balneotherapy is best taught as one possible component of a person-centred rehabilitation programme rather than as an isolated procedure. Aquatic environments can facilitate movement practice, graded strengthening, endurance, balance and relaxation under altered loading conditions [5,17].

- link each procedure to a functional goal and an outcome measure;
- combine water-based treatment with land-based exercise or education when clinically appropriate;
- progress intensity and complexity according to response rather than calendar alone;
- plan transfer of gains to daily activity and participation;
- support physical activity, self-management and realistic expectations after discharge.

9.1 Older adults and multimorbidity

Older adults may benefit from reduced weight-bearing and supported movement but also have greater vulnerability to falls, cardiovascular instability, impaired thermoregulation, polypharmacy and fatigue. Training should therefore emphasize function, frailty, assistance needs and treatment tolerance rather than age alone. The goal is safe participation and maintenance or improvement of independence.

10. Documentation, outcomes and quality improvement

10.1 Minimum treatment record

- indication/diagnosis and functional goal;
- pre-treatment risk assessment and relevant precautions;
- resource/intervention and treatment parameters;
- assistance/supervision level;
- response during and immediately after treatment;
- adverse events or reasons for treatment modification;
- outcome measure(s) and planned review date.

10.2 Outcome domains

Outcome measures should match the clinical goal and may include:

- pain intensity;
- joint-specific or condition-specific function;
- mobility or gait;
- balance;
- exercise tolerance;
- activities of daily living;
- health-related quality of life;
- medication use where relevant;
- patient-reported global improvement;
- treatment adherence and adverse events.

11. Suggested teaching and assessment format

The following structure is illustrative and does not establish WHO or FEMTEC minimum training hours. Programmes may expand or combine modules according to learner background, profession and national requirements.

Module	Core content	Preferred learning method	Competency evidence
1. Terminology & scope	Definitions, professional boundaries, medical vs wellness use	Short seminar + terminology exercise	Correctly classifies case examples and interventions
2. Aquatic physics & resources	Buoyancy, drag, immersion physiology, thermal effects, natural resources	Seminar + pool/resource demonstration	Explains relevant effects and documents resource characteristics
3. Assessment & prescription	Goals, risk stratification, parameters, monitoring	Case-based workshop	Writes an individualized, reproducible prescription
4. Procedures	Immersion, aquatic exercise, peloids and locally relevant techniques	Supervised practical session	Performs/observes procedures within scope using safety checklist
5. Evidence	Recent evidence, limitations, communication of uncertainty	Critical appraisal workshop	Interprets a study and counsels without overclaiming
6. Safety & emergencies	Adverse events, infection control, facility risks, escalation	Simulation / drills	Recognizes stop criteria and demonstrates response pathway
7. Rehabilitation integration	Functional goals, progression, older adults, self-management	Case conference	Builds a multimodal plan and progression criteria
8. Documentation & QA	Outcome measures, adverse-event record, audit	Documentation exercise	Completes record and identifies quality-improvement indicators

11.1 Assessment methods

- short knowledge assessment for terminology, physiology and safety;
- case-based written prescription;
- direct observation or OSCE-style practical station where facilities permit;
- critical appraisal of a hydro/balneotherapy study;
- simulation of an adverse event or emergency response;
- portfolio/logbook for supervised clinical exposure;
- final competency sign-off by an appropriately qualified local supervisor.

12. Practical training tools

12.1 Illustrative hydro/balneotherapy prescription template

Patient / clinical problem	
Functional goal	
Intervention / resource	
Water/resource characteristics	
Temperature	
Immersion depth / application area	
Session duration	
Frequency / planned course	

Exercise or procedural parameters	
Co-interventions	
Precautions / monitoring	
Assistance level	
Stop criteria	
Outcome measure and review point	

12.2 Pre-treatment safety checklist for teaching

- ☐ Clinical indication and treatment goal documented.
- ☐ Relevant cardiovascular/respiratory stability considered.
- ☐ Skin integrity and infection risk checked.
- ☐ Neurological/cognitive status and ability to follow instructions assessed.
- ☐ Transfer, balance and falls risk assessed.
- ☐ Thermoregulatory/frailty risks considered.
- ☐ Treatment parameters and supervision level specified.
- ☐ Emergency access and stop criteria understood by staff.
- ☐ Patient informed about expected effects, uncertainties and when to report symptoms.

12.3 Adverse-event training record

Date/time	
Intervention and treatment parameters	
Event description	
Severity	
Suspected relationship to treatment	
Immediate action	
Treatment stopped/modified?	
Clinical outcome/follow-up	
Formal reporting required?	

13. Final considerations for adaptation

This package is intentionally a technical and educational framework rather than a universal curriculum. Before local implementation, the responsible institution should review national legislation, scope-of-practice rules, facility standards, terminology, natural-resource regulation, referral pathways and emergency procedures. Content on indications should be updated as evidence evolves. Local adaptations should retain the core principles of patient safety, qualified practice, transparent evidence communication, reproducible treatment documentation and quality assurance.

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Appendix A. How the FEMTEC source material was used

The original FEMTEC educational document contributed the field-specific scope and many of the teaching domains used here: historical context, natural therapeutic factors, climate, mineral waters, therapeutic lakes, rehabilitation, prophylactic and therapeutic balneal care, and considerations for older adults. For this draft, historical material was substantially shortened; older disease-specific claims based mainly on water composition were not carried forward as clinical recommendations; terminology was clarified; treatment prescription, risk stratification, adverse-event reporting, facility quality and competency assessment were strengthened; and recent evidence and WHO frameworks were added. This preserves the educational intent of the source while making the package more appropriate for international technical review.

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