A Smarter Way to Promote Healing of Bones

HYDROHEAL is an ongoing research project aiming to transform how we treat complex bone fractures.

Designed with both patients and clinicians in mind, our injectable hydrogel is being developed to promote natural healing, enable precise drug delivery, and help prevent infection - all with minimal surgery and the potential for significant clinical impact.

Minimally Invasive Application
Delivered through a simple injection, HYDROHEAL avoids open surgery and speeds up recovery

Targeted Therapy On-Demand
Therapeutic agents will be released precisely where and when needed, using ultrasound triggers

Biodegradable & Environmentally Safe
The hydrogel gradually breaks down as bone regenerates, leaving no toxic residue behind

Infection Defence Without Antibiotics
Antibacterial properties help prevent infections without promoting resistance

On the Path to Validation
Being tested with human cells, bacteria and animal models to assess safety and effectiveness

Better Outcomes, Reduced Costs
Aimed at improving patient care while reducing strain on health systems across Europe

HYDROHEAL

13 Partners, 7 Countries, 1 Vision

HYDROHEAL is a collaborative research project between 13 partners from 7 countries.

Our consortium coordinated by the Technical University of Valencia (UPV) brings together world-class universities, cutting-edge research institutions, innovation hubs, and forward-thinking small and medium-sized enterprises.

Together, we span the full value chain: from materials science, bioengineering, and drug delivery to clinical translation, regulatory strategy, and sustainable manufacturing.

Funded by the European Union

HYDROHEAL

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A Smarter Way to Promote Healing of Bones

HYDROHEAL aims to develop a new generation of multifunctional, injectable hydrogels to treat complex bone fractures more safely and effectively

www.hydroheal.eu

The Problem

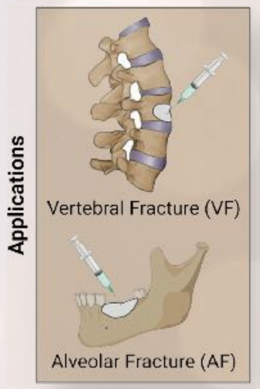
Every year, millions of people suffer from fractures in delicate and hard-to-treat areas like the spine (vertebral fractures, VF) and jaw (alveolar fractures, AF).

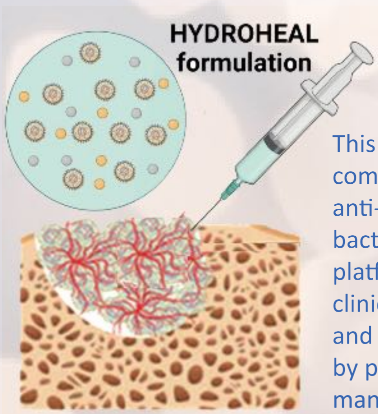
Current treatments often rely on synthetic bone cement or invasive bone grafting, which can cause complications, fail to support proper healing, and carry high costs for patients and health systems.

The Solution: HYDROHEAL - a new therapeutic strategy

We are engineering a biodegradable hydrogel formulation that:

- Can be injected minimally invasively into bone defects,
- Adapts to the body and hardens in place,
- Contains nano- and micro-scale carriers loaded with therapeutic agents,
- Enables on-demand drug release triggered by external ultrasound stimulation
- Gradually dissolves as the bone regenerates, leaving no toxic residue behind.





This composite material combines bone-stimulating, anti-inflammatory, and anti-bacterial functions in one smart platform. It is designed for high clinical impact, patient comfort, and environmental sustainability by providing scalable green manufacturing processes.

Our Goal & Working Plan

To develop and test a safe, effective, and environmentally friendly produced hydrogel that can be injected into bone fractures—then dissolve naturally as the bone heals.

Identification

We begin by identifying what patients and doctors truly need. Then, our scientists create the hydrogel using smart, bio-based materials. Tiny particles inside the gel carry medicine that can be released on demand—triggered by ultrasound from outside the body.

GET INVOLVED

and join our Clinical Advisory Board!
If you are Orthopaedic or Dentist, we invite you to answer our short questionaires:

Clinical Benchmarking

Target Profile for HYDROHEAL Formulation

HYDROHEAL

Testing

Next, we test these materials in the lab using human cells and bacteria to ensure they are safe and work as intended. Once we have the most promising version, we test it further in animal models that mimic real bone fractures.

Production

At the same time, we make sure the material can be produced in a way that's scalable, affordable, and sustainable. We use artificial intelligence to help optimize the formulation and ensure it meets clinical standards.

Feedback

We work closely with patients, doctors, and regulators to prepare everything needed for future clinical trials. From lab bench to hospital bed, the HYDROHEAL project is about turning advanced science into a practical solution that can improve lives across Europe and beyond.