

Ready to Begin Your Recovery?

Scan the QR code or visit our portal to schedule your therapy session:

<https://outrecover.com/>



Whether you're recovering from joint surgery, managing arthritis, rehabilitating after a sports injury, or simply investing in your long-term joint health, OutRecover offers a range of science-backed therapies designed to help. Here's what the research says about how each of our services can support your orthopedic recovery — including your knees, hips, shoulders, elbows, ankles, feet, hands, and more.

A NOTE ABOUT THE CLINICAL RESEARCH

The research summarized in this guide comes directly from published clinical trials, systematic reviews, and peer-reviewed medical journals^[1-38]. While these modalities show promising biological and clinical benefits, individual responses vary. Our clinical team will tailor your treatment protocol to your condition, recovery stage, and health goals. **Always consult with your physician before starting any new therapy**, especially if recovering from surgery or managing a joint condition.

PEMF Therapy (Pulsed Electromagnetic Field)

Delivers gentle electromagnetic pulses to your body to support healing at the cellular level.

- A meta-analysis of 16 placebo-controlled trials found that PEMF significantly reduces pain, stiffness, and improves physical function in patients with osteoarthritis — with a large effect on pain (60% decrease in VAS scores, 42% improvement in WOMAC scores)^[1,2].
- PEMF has been shown to be effective for both knee and hand osteoarthritis, with sessions of 30 minutes or less achieving the best results^[3].
- Both low- and high-intensity PEMF are safe and well-tolerated, with no serious adverse events reported across studies^[4].

BEST FOR: Knee osteoarthritis, hand arthritis, joint pain and stiffness, post-surgical healing.

Hyperbaric Oxygen Therapy (HBOT)

You breathe concentrated oxygen in a pressurized chamber, flooding your body with healing oxygen.

- Animal studies show that HBOT accelerates fracture healing by increasing bone mineral density, improving bone formation rates, and enhancing the structural strength of healing bone^[5].
- A meta-analysis of 11 randomized controlled trials (668 patients) found that adjuvant HBOT significantly improves healing rates and reduces the risk of major amputation in patients with diabetic foot ulcers, when added to standard wound care^[6].
- A 2023 review of the biological mechanisms of HBOT in knee injuries found it may support healing of tendon, ligament, and cartilage tissue after knee surgery by promoting new blood vessel formation and favorably modulating inflammation — though the authors note further clinical research is still needed to confirm these benefits^[7].

BEST FOR: Post-surgical recovery, fracture healing support, tendon and ligament healing, non-healing diabetic wounds, reducing inflammation.

Class IV Laser Therapy

Uses a high-powered therapeutic laser to deliver healing light energy deep into tissues.

- A network meta-analysis of 10 trials (580 patients) found that high-intensity laser therapy (HILT) ranked as the most effective physical therapy modality for relieving knee osteoarthritis pain (SUCRA = 100%) and improving function (SUCRA = 98.9%)^[8].
- HILT was found to be more effective than conventional physiotherapy and exercise therapy alone, with benefits sustained at 12-week follow-up^[9].

BEST FOR: Knee osteoarthritis, joint pain, improving range of motion, accelerating tissue repair.

Shockwave Therapy

Delivers focused sound wave pulses to painful or injured areas to stimulate your body's natural repair processes.

- A systematic review of 18 randomized controlled trials found that shockwave therapy effectively relieves pain in rotator cuff tendonitis (shoulder), lateral epicondylitis (tennis elbow), finger tendonitis, and long bicipital tendonitis, with benefits sustained at 3- and 6-month follow-ups^[10].
- High-quality evidence shows shockwave therapy has a large effect on pain and function for plantar fasciitis (foot/heel pain)^[11].
- A meta-analysis of 9 trials (530 patients) found moderate-quality evidence that radial shockwave therapy significantly improves wrist extensor strength in patients with tennis elbow^[12].
- A systematic review of 28 randomized controlled trials confirmed that high-energy shockwave therapy is effective for improving pain, shoulder function, and complete resolution of calcifications in chronic calcific shoulder tendinitis^[13].
- A randomized trial of 42 patients with calcified rotator cuff tendinopathy showed shockwave therapy significantly reduced pain, improved functional disability, quality of life, and decreased the size of calcified deposits compared to routine physiotherapy^[14].

BEST FOR: Shoulder tendonitis, tennis elbow, plantar fasciitis, calcific tendinopathy.

Blood Flow Restriction (BFR) Training

Uses low-pressure bands on your limbs to safely restrict blood flow during light exercise, triggering your body to build muscle with much less weight than normally required.

- A meta-analysis of 17 studies (643 participants) found that BFR training significantly improves quadriceps strength after ACL reconstruction, supported by moderate-certainty evidence^[15].
- A large multicenter study of 316 patients showed BFR accelerated early functional recovery after ACL reconstruction, with superior outcomes at 4, 8, and 12 weeks compared to standard rehabilitation^[16].
- A systematic review and meta-analysis found that BFR in the postoperative period after knee surgery significantly improves quadriceps muscle bulk compared to control groups^[17].
- A systematic review of 19 studies (322 patients) evaluating BFR safety in musculoskeletal disorders found that adverse events were rare, and individuals exposed to BFR were not more likely to have an adverse event than those doing exercise alone^[18].
- BFR allows muscle building using only 20–40% of the weight normally required — ideal for protecting healing joints from heavy loads^[19].

BEST FOR: Post-ACL surgery rehabilitation, knee surgery recovery, rebuilding strength safely, early-stage joint recovery.

Lymphatic Compression & Normatec Compression Therapy

Uses rhythmic, wave-like pressure to move fluid through your body, reduce swelling, and improve circulation.

- Pneumatic compression is well-established for preventing blood clots (DVT) after orthopedic surgeries, including knee and hip replacements^[32].
- A multicenter randomized trial of 280 patients found that adding pneumatic cold-compression after total knee replacement reduced narcotic pain medication use in the first two weeks and produced significantly higher patient satisfaction compared to standard ice and static compression^[33].
- Normatec-style sequential compression is widely used by professional athletes for recovery between training sessions.

BEST FOR: DVT prevention, post-surgical comfort, circulation support, athletic recovery.

Infrared Sauna Therapy

Uses infrared light wavelengths to deliver deep, therapeutic heat that penetrates your tissues.

- A 2025 review found that infrared sauna therapy reduces inflammatory markers (TNF- α , CRP, PGE2) while promoting anti-inflammatory effects, with clinical benefits for rheumatoid arthritis, ankylosing spondylitis, and osteoarthritis^[20].
- A clinical study of 207 patients with hip/knee osteoarthritis, low back pain, or rheumatoid arthritis found significant pain reduction and mobility improvements with infrared therapy compared to placebo^[21].

BEST FOR: Arthritis pain and stiffness, muscle recovery, inflammation reduction.

Red Light Therapy (Photobiomodulation)

Delivers specific wavelengths of red and near-infrared light to boost cellular energy and reduce inflammation.

- A systematic review of 10 placebo-controlled trials (542 patients) found that photobiomodulation significantly reduces pain at rest in knee osteoarthritis patients compared to placebo^[22].
- A randomized, placebo-controlled trial of 168 patients confirmed that photobiomodulation reduces pain intensity in knee osteoarthritis, with benefits sustained at 6-month follow-up^[23].
- A 2025 double-blind randomized trial of 65 patients showed photobiomodulation significantly reduced pain and improved WOMAC scores (pain, stiffness, function) compared to both placebo and no-treatment groups^[24].

BEST FOR: Knee osteoarthritis, rheumatoid arthritis, joint pain, inflammation.

Molecular Hydrogen Inhalation

You breathe in molecular hydrogen gas, a powerful antioxidant that targets harmful free radicals in your body.

- Animal studies show hydrogen-rich water protects cartilage from damage in osteoarthritis models by inhibiting oxidative stress, reducing matrix-degrading enzymes, and decreasing cartilage cell death^[25].

BEST FOR: Antioxidant support, cartilage protection (early-stage evidence).

Responsive Oxygen Therapy (ROT)

Uses adaptive oxygen cycling — alternating between high and low oxygen levels — to stimulate your body's natural repair and recovery systems.

- Research shows intermittent hypoxia training significantly enhances fracture healing by increasing bone mineral density, bone formation rates, and structural strength in aged animal models^[26].
- A separate study confirmed that chronic intermittent hypobaric hypoxia enhances fracture healing by upregulating bone formation genes (RUNX2, osterix) and promoting new blood vessel growth at the fracture site^[27].
- A clinical study of 38 healthy older adults (ages 65–75) found that 24 weeks of intermittent hypoxia exposure reduced bone resorption markers, increased bone formation markers, and decreased inflammatory markers (CRP) and body fat^[28].
- A comprehensive review confirmed that low-dose intermittent hypoxia is safe and has therapeutic potential across multiple physiological systems^[29].

BEST FOR: Fracture healing support, bone health, cardiovascular conditioning, rehabilitation.

H-Wave Electrotherapy

Delivers rhythmic electrical stimulation to improve circulation, reduce pain, and support healing.

- A 2023 comparative review of electrical stimulation devices found that H-Wave device stimulation has moderate supportive evidence for treating acute and refractory chronic pain, consistently improving function and pain measures across diverse patient populations^[34].
- The same review found H-Wave device stimulation was associated with more clinically significant outcomes than several other electrical stimulation modalities, including reduced pain medication use^[34].
- It is commonly used as part of multimodal rehabilitation programs for joint and soft tissue injuries.

BEST FOR: Pain management, circulation support, post-injury recovery.

Dry Cold Plunge (Cryotherapy)

Uses cryo-thermal technology to deliver the benefits of cold exposure without getting wet — reducing inflammation and activating your body's calming nervous system response.

- The primary established benefit of cryotherapy is pain reduction (analgesia) following injury or exercise^[30].
- A 2024 review in the British Journal of Sports Medicine confirmed the analgesic effect of cryotherapy and recommended its use in the first 6 hours following injury for pain and possible hematoma reduction^[31].
- Cold exposure activates the parasympathetic ("rest and recover") nervous system, promoting a powerful recovery reset.

BEST FOR: Post-injury pain relief, post-workout recovery, nervous system reset.

Vitamin D Light Therapy

Uses UVB light to help your body naturally produce vitamin D.

- Vitamin D deficiency is strongly linked to musculoskeletal pain, bone weakness, and increased fracture risk.
- A meta-analysis of 7 randomized trials (12,620 older adults) found that vitamin D3 combined with calcium supplementation significantly reduced the risk of hip fracture and other non-vertebral fractures compared to placebo^[35].
- Low vitamin D is common in patients scheduled for joint replacement and is recognized as a modifiable risk factor worth addressing before surgery as part of a broader metabolic optimization plan^[36].

BEST FOR: Bone health, fracture prevention, immune support, overall wellness.

OxeFit Smart Strength Training & AI Bike Training

OxeFit uses AI and 3D motion tracking for precision strength training with minimal joint stress. AI Bike delivers an efficient cardio workout using adaptive resistance.

- An overview of 21 meta-analyses (4,400+ hip/knee replacement patients) found structured resistance training before and after surgery reduced complications and improved strength, function, and quality of life, especially in the first 6 months^[37].
- Low-load, technology-guided strength training minimizes stress on healing joints while still building muscle.
- Cardiovascular fitness supports overall recovery capacity and has been shown to improve outcomes after orthopedic surgery.

BEST FOR: Safe strength building, joint rehabilitation, cardiovascular health, performance.

PNOE Biometric Testing & InBody Body Composition Analysis

PNOE measures how your body uses oxygen, burns fuel, and responds to stress. InBody breaks down your body composition (muscle, fat, water) beyond what a scale can tell you.

- Understanding your body composition helps identify muscle imbalances that may contribute to joint problems.
- A multicenter study of 140 total knee replacement patients found that sarcopenia (low muscle mass) was an independent risk factor for failing to reach meaningful improvement in pain and function scores one year after surgery, suggesting that identifying and addressing muscle loss beforehand may improve outcomes^[38].
- Tracking changes over time ensures your rehabilitation is progressing effectively.
- Excess body weight is a major risk factor for knee and hip osteoarthritis — monitoring composition helps guide weight management.

BEST FOR: Personalized recovery planning, tracking progress, optimizing nutrition and training.

References

- Yang X, He H, Ye W, et al. "Effects of Pulsed Electromagnetic Field Therapy on Pain, Stiffness, Physical Function, and Quality of Life in Patients With Osteoarthritis: A Systematic Review and Meta-Analysis of Randomized Placebo-Controlled Trials." *Physical Therapy*, 2020. **PMID: 32251502**.
- Cianni L, Di Galleonardo E, Coppola D, et al. "Current Evidence Using Pulsed Electromagnetic Fields in Osteoarthritis: A Systematic Review." *Journal of Clinical Medicine*, 2024. **PMID: 38610722**.
- Wu Z, Ding X, Lei G, et al. "Efficacy and Safety of the Pulsed Electromagnetic Field in Osteoarthritis: A Meta-Analysis." *BMJ Open*, 2018. **PMID: 30552258**.
- Silva LD, Batista JD, Batista JD, et al. "Efficacy and Safety of Low- and High-Intensity Magnetic Field Therapies for Orthopedic Pain: A Systematic Review." *Frontiers in Pain Research*, 2025. **PMID: 42146884**.
- Kawada S, Wada E, Matsuda R, Ishii N. "Hyperbaric Hyperoxia Accelerates Fracture Healing in Mice." *PLoS ONE*, 2013. **PMID: 23967323**.
- Moreira DA Cruz DL, Oliveira-Pinto J, Mansilha A. "The Role of Hyperbaric Oxygen Therapy in the Treatment of Diabetic Foot Ulcers: A Systematic Review with Meta-Analysis of Randomized Controlled Trials on Limb Amputation and Ulcer Healing." *International Angiology*, 2021. **PMID: 34236155**.
- Leite CBG, Tavares LP, Leite MS, Demange MK. "Revisiting the Role of Hyperbaric Oxygen Therapy in Knee Injuries: Potential Benefits and Mechanisms." *Journal of Cellular Physiology*, 2023. **PMID: 36649313**.
- Wu M, Luan L, Pranata A, et al. "Is High Intensity Laser Therapy More Effective Than Other Physical Therapy Modalities for Treating Knee Osteoarthritis? A Systematic Review and Network Meta-Analysis." *Frontiers in Medicine*, 2022. **PMID: 36186780**.
- Nazari A, Moezy A, Nejati P, Mazaherinezhad A. "Efficacy of High-Intensity Laser Therapy in Comparison With Conventional Physiotherapy and Exercise Therapy on Pain and Function of Patients With Knee Osteoarthritis: A Randomized Controlled Trial With 12-Week Follow Up." *Lasers in Medical Science*, 2019. **PMID: 30178432**.
- Xiong Y, Wen T, Jin S, et al. "Efficacy and Safety of Extracorporeal Shock Wave Therapy for Upper Limb Tendonitis: A Systematic Review and Meta-Analysis of Randomized Controlled Trials." *Frontiers in Medicine*, 2024. **PMID: 39139789**.
- Charles R, Fang L, Zhu R, Wang J. "The Effectiveness of Shockwave Therapy on Patellar Tendinopathy, Achilles Tendinopathy, and Plantar Fasciitis: A Systematic Review and Meta-Analysis." *Frontiers in Immunology*, 2023. **PMID: 37662911**.
- Stania M, Pawlowski M, Benduch M, et al. "Efficacy of Radial and Focused Shockwave Therapy for Tendinopathy: A Systematic Review and Meta-Analysis." *Scientific Reports*, 2026. **PMID: 41651897**.
- Bannuru RR, Flavin NE, Vaysbrot E, Harvey W, McAlindon T. "High-Energy Extracorporeal Shock-Wave Therapy for Treating Chronic Calcific Tendinitis of the Shoulder: A Systematic Review." *Annals of Internal Medicine*, 2014. **PMID: 24733195**.
- Fatima A, Ahmad A, Gilani SA, et al. "Effects of High-Energy Extracorporeal Shockwave Therapy on Pain, Functional Disability, Quality of Life, and Ultrasonographic Changes in Patients with Calcified Rotator Cuff Tendinopathy." *BioMed Research International*, 2021. **PMID: 35281612**.
- Xu N, Wang T, Guo R, et al. "The Effectiveness of Blood Flow Restriction Training on Rehabilitation After Anterior Cruciate Ligament Reconstruction: A Systematic Review and Meta-Analysis." *Journal of Clinical Medicine*, 2026. **PMID: 42355875**.
- Liu D, Zhang H, Zheng B, Yang Q. "Multicenter Retrospective Study of Blood Flow Restriction Training After Anterior Cruciate Ligament Reconstruction." *Journal of Visualized Experiments*, 2025. **PMID: 41284594**.
- Wengle L, Migliorini F, Leroux T, et al. "The Effects of Blood Flow Restriction in Patients Undergoing Knee Surgery: A Systematic Review and Meta-Analysis." *The American Journal of Sports Medicine*, 2022. **PMID: 34406084**.
- Minniti MC, Statkevich AP, Kelly RL, et al. "The Safety of Blood Flow Restriction Training as a Therapeutic Intervention for Patients With Musculoskeletal Disorders: A Systematic Review." *The American Journal of Sports Medicine*, 2020. **PMID: 31710505**.
- Watson R, Sullivan B, Stone A, et al. "Blood Flow Restriction Therapy: An Evidence-Based Approach to Postoperative Rehabilitation." *JBJS Reviews*, 2022. **PMID: 36191086**.
- Fedorchenko Y, Fedorchenko M, Yessirkepov M, Bekarysova D. "Sauna Therapy in Rheumatic Diseases: Mechanisms, Potential Benefits, and Cautions." *Rheumatology International*, 2025. **PMID: 40202605**.
- Siems W, Bresgen N, Brenke R, et al. "Pain and Mobility Improvement and MDA Plasma Levels in Degenerative Osteoarthritis, Low Back Pain, and Rheumatoid Arthritis After Infrared A-Irradiation." *Acta Biochimica Polonica*, 2010. **PMID: 20827448**.
- Oliveira S, Andrade R, Valente C, et al. "Effectiveness of Photobiomodulation in Reducing Pain and Disability in Patients With Knee Osteoarthritis: A Systematic Review With Meta-Analysis." *Physical Therapy*, 2024. **PMID: 38775202**.
- Alquale-Costa R, Rampazo ÉP, Thome GR, Perracini MR, Lievano RE. "Interferential Current and Photobiomodulation in Knee Osteoarthritis: A Randomized, Placebo-Controlled, Double-Blind Clinical Trial." *Clinical Rehabilitation*, 2021. **PMID: 33896234**.
- Dos Santos Maciel T, Corrêa Lima Chamy N, Dos Santos Maciel M, Pasqual Marques A. "Effect of Photobiomodulation (Low-Level Laser Therapy) in Patients With Knee Osteoarthritis: A Randomized Controlled Trial." *Lasers in Medical Science*, 2025. **PMID: 40545487**.
- Cheng S, Peng L, Xu B, et al. "Protective Effects of Hydrogen-Rich Water Against Cartilage Damage in a Rat Model of Osteoarthritis by Inhibiting Oxidative Stress, Matrix Catabolism, and Apoptosis." *Medical Science Monitor*, 2020. **PMID: 31927559**.
- Qiao J, Zhou M, Li Z, et al. "Comparison of Remote Ischemic Preconditioning and Intermittent Hypoxia Training in Fracture Healing." *Molecular Medicine Reports*, 2019. **PMID: 30592272**.
- Zhang L, Jin L, Guo J, et al. "Chronic Intermittent Hypobaric Hypoxia Enhances Bone Fracture Healing." *Frontiers in Endocrinology*, 2021. **PMID: 33664707**.
- Timon R, González-Custodio A, Vasquez-Bonilla A, Olcina G, Leal A. "Intermittent Hypoxia as a Therapeutic Tool to Improve Health Parameters in Older Adults." *International Journal of Environmental Research and Public Health*, 2022. **PMID: 35564732**.
- Navarrete-Opazo A, Mitchell GS. "Therapeutic Potential of Intermittent Hypoxia: A Matter of Dose." *American Journal of Physiology*, 2014. **PMID: 25231353**.
- Kwiecien SY, McHugh MP. "The Cold Truth: The Role of Cryotherapy in the Treatment of Injury and Recovery From Exercise." *European Journal of Applied Physiology*, 2021. **PMID: 33877402**.
- Racinais S, Dablainville V, Rousse Y, et al. "Cryotherapy for Treating Soft Tissue Injuries in Sport Medicine: A Critical Review." *British Journal of Sports Medicine*, 2024. **PMID: 39237265**.
- Chughtai M, Newman JM, Solow M, et al. "Mechanical Prophylaxis after Lower Extremity Total Joint Arthroplasty: A Review." *Surgical Technology International*, 2017. **PMID: 29310148**.
- Su EP, Perna M, Boettner F, et al. "A Prospective, Multi-Center, Randomised Trial to Evaluate the Efficacy of a Cryopneumatic Device on Total Knee Arthroplasty Recovery." *The Journal of Bone and Joint Surgery (British Volume)*, 2012. **PMID: 23118406**.
- Allen CB, Williamson TK, Norwood SM, Gupta A. "Do Electrical Stimulation Devices Reduce Pain and Improve Function? A Comparative Review." *Pain and Therapy*, 2023. **PMID: 37751060**.
- Manoj P, Derwin R, George S. "What Is the Impact of Daily Oral Supplementation of Vitamin D3 (Cholecalciferol) Plus Calcium on the Incidence of Hip Fracture in Older People? A Systematic Review and Meta-Analysis." *International Journal of Older People Nursing*, 2022. **PMID: 35842938**.
- Liu C, Brinkmann E, Chou SH, et al. "Team Approach: Preoperative Management of Metabolic Conditions in Total Joint Replacement." *JBJS Reviews*, 2021. **PMID: 34910700**.
- Keogh JAJ, Keng I, Dhillon DS, et al. "The Effects of Structured Prehabilitation on Postoperative Outcomes Following Total Hip and Total Knee Arthroplasty: An Overview of Systematic Reviews and Meta-Analyses of Randomized Controlled Trials." *Journal of Orthopaedic and Sports Physical Therapy*, 2025. **PMID: 40298246**.
- Humphrey TJ, Salimy MS, Jancuska JM, et al. "Sarcopenia Is an Independent Risk Factor for Failure to Achieve the 1-Year MCID of the KOOS, JR and PROMIS PF-SF10a After TKA." *The Knee*, 2023. **PMID: 36913864**.