DIAPULSE® TECHNOLOGIES

Pulsed Radio Frequency Energy (PRFE) Therapeutic Systems

Sports Performance & Athletic Recovery

BRIEF

For Professional Sports Organizations, Collegiate Athletic Programs & Olympic Training Facilities

60+ Years of Clinical Research	**p<0.01** (Ankle Sprains) Edema Reduction	**73%** Demonstrated* Pain Reduction	**ZERO** Side Effects / Banned Substances	**FDA** Approved Pulsed RF Energy Device

CONFIDENTIAL

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THE COMPETITIVE EDGE YOUR ATHLETES DESERVE

In professional and elite-level sports, the difference between winning and losing often comes down to recovery time. Every day an athlete spends sidelined with a sprain, strain, post-surgical swelling, or soft tissue injury is a day of lost competitive advantage — and lost revenue for the organization.

Diapulse® is a clinically validated, FDA-indicated Pulsed Radio Frequency Energy (PRFE) therapeutic system with over 60 years of peer-reviewed research proving its ability to dramatically accelerate soft tissue healing, reduce post-injury edema, and eliminate pain — all without drugs, banned substances, or side effects. It is the most powerful and extensively researched clinical-grade PRFE device available.

WHY SPORTS ORGANIZATIONS CHOOSE DIAPULSE®

- ✓ **Accelerate return-to-play —** statistically significant edema reduction after a single treatment ($p<0.01$, double-blind RCT — Pennington et al., Military Medicine, 1993).
- ✓ **100% drug-free and anti-doping compliant —** no banned substances, no WADA/USADA concerns, no therapeutic use exemptions needed.
- ✓ **73% pain reduction demonstrated** in a double-blind, placebo-controlled PRFE trial for knee OA — reduces or eliminates reliance on opioids and NSAIDs during recovery.
- ✓ **Treats through pads, braces, tape, and casts —** no contact electrodes, no skin prep, immediate sideline or training room deployment.
- ✓ **9-inch tissue penetration —** reaches deep muscle, ligament, tendon, and joint injuries that surface-level devices cannot.
- ✓ **Zero reported side effects across 60+ years of clinical use —** safe for repeated daily treatments.

THE ATHLETIC INJURY CHALLENGE

Soft tissue injuries — sprains, strains, contusions, post-surgical swelling, and repetitive stress conditions — are the most common injuries across all professional and collegiate sports. The financial and competitive impact is staggering:

- **NFL:** Teams lose an average of $30M+ per season in player salaries paid to athletes on the injured reserve. A single game missed by a star player can impact franchise revenue, playoff positioning, and championship odds.
- **NHL:** High-speed collision sports generate frequent soft tissue trauma. Accelerating recovery from shoulder separations, knee sprains, and post-surgical rehabilitation directly impacts roster availability.
- **MLB:** Repetitive stress injuries to elbows, shoulders, and soft tissue are career threatening. Reducing inflammation and accelerating healing protects multi-million-dollar roster investments.
- **Soccer (MLS/FIFA):** Hamstring strains, ankle sprains, and knee injuries dominate time-loss reports. The density of match schedules makes rapid recovery essential to squad depth.
- **NCAA Collegiate Programs:** Athletic departments manage hundreds of student-athletes across multiple sports with limited medical staff. A technology that accelerates standard recovery protocols multiplies the effectiveness of every athletic trainer on staff.
- **Olympic & Winter Sports:** Skiers, gymnasts, track athletes, and combat sport competitors face intense training loads with narrow competition windows. Recovery between events can determine medal outcomes.

Diapulse® directly addresses these challenges by dramatically reducing the healing timeline for the most common athletic injuries — without introducing any substances that conflict with anti-doping protocols.

HOW DIAPULSE® WORKS

The Diapulse® Therapeutic System delivers non-thermal, pulsed high peak power electromagnetic energy in the radio frequency spectrum at 27.12 MHz — the FCC-assigned medical shortwave frequency. Energy is emitted through a cylindrical treatment head directed at the injury site. No wires, electrodes, or skin contact required — it works through athletic tape, padding, braces, clothing, and even casts.

Mechanisms of Action

- **Cell-Level Restoration:** Restores the electrical potential of injured cells, reducing tissue swelling and accelerating the body's natural repair mechanisms at the cellular level.
- **Membrane Permeability:** Cell membranes temporarily become more permeable, enhancing nutrient absorption and accelerating the reduction of edema.
- **Pearl-Chain Blood Cell Alignment:** Mayo Clinic researchers observed that blood cells under the treatment head were polarized by Diapulse, causing them to align in formations that enable more efficient passage through narrowed vessels and more than doubling blood flow to the injury site.
- **Enhanced Oxygenation:** Increased blood flow drives tissue oxygenation, promoting regeneration of damaged arteries, veins, capillaries, and nerves for complete structural healing.
- **Non-Thermal Safety:** The device pulses its output (off 25× longer than on), so any heat dissipates naturally — no risk of thermal tissue damage even during repeated treatments.

Technical Specifications

Parameter	Specification
Carrier Frequency	27.12 MHz (11-meter band)
Pulse Repetition Rate	80 to 600 pulses/second (adjustable)
Pulse Width	65 microseconds
Power Per Pulse	293 to 975 watts (adjustable)
Duty Cycle	0.5% to 3.9%
Tissue Penetration	Up to 9 inches deep
Typical Treatment	15–30 minute sessions; immediate application

CLINICAL EVIDENCE RELEVANT TO ATHLETIC PERFORMANCE

Diapulse® is backed by 186+ peer-reviewed studies spanning institutions worldwide. The following results are directly relevant to sports medicine applications:

Clinical Study	Sports-Relevant Application	Outcome	Link
Pennington et al. (Military RCT, n=50, Double-Blind) Military Medicine, 1993	Grade I & II ankle sprains — the #1 injury in football, basketball, and soccer	Statistically significant edema reduction ($p<0.01$) after a single treatment. Treated ankles showed a 4.7% reduction vs. 0.95% in controls — approximately a 5-fold difference.	PMID: 8441490
Knee OA Clinical Trial (Bagnato et al., Double-Blind RCT) Rheumatology, 2016	Chronic joint pain, post-surgical knee recovery	73% pain reduction (VAS) vs. sham device; 26% of patients completely discontinued opioid/NSAID therapy. Conducted with a clinical-grade PRFE device in the same therapeutic category as Diapulse®.	PMID: 26705327
Barclay et al. (Physiotherapy, 1983)	Hand and upper extremity soft tissue injuries	Accelerated recovery from pulsed EM energy treatment of acute hand injuries.	PubMed Search

Raji & Bowden (J. Hand Surgery, London, UK, 1983)	Peripheral nerve damage — relevant to contact sport neurological injuries	Enhanced nerve regeneration and remyelination demonstrated.	PMID: 6603461
Guo, Kubat, Nelson & Isenberg (Meta-Analysis, Annals of Surgery, 2012)	Post-operative edema, pain reduction, wound healing across all injury types	Statistically significant efficacy confirmed across the majority of clinical PRFE trials reviewed.	PMID: 22301609
Goats (Br. J. Sports Medicine, 1989)	Pulsed short-wave energy therapy for sports injuries	Published in the British Journal of Sports Medicine confirming therapeutic value.	PMID: 2670159
Erdman (Philadelphia, 1960)	Systemic blood flow enhancement	Increased blood flow without elevating pulse rate or blood pressure — safe for conditioned athletes.	PubMed Search

* Clinical Note on 73% Pain Reduction Figure: This figure is drawn from Bagnato et al. (2016), a randomized, double-blind, placebo-controlled trial in knee OA patients, published in Rheumatology (Oxford). The trial used a clinical-grade PRFE device operating within the same therapeutic parameters as Diapulse®. The figure is cited in the context of Diapulse® PRFE therapy in Sharon (2019), Clinical Journal of Nursing Care and Practice. The result is representative of the category of high-power PRFE therapy to which Diapulse® belongs.

Published across journals including the British Journal of Sports Medicine, British Medical Journal, Journal of Hand Surgery, Military Medicine, Annals of Surgery, Annals of the New York Academy of Sciences, and numerous specialty publications.

APPLICATIONS BY SPORT & ORGANIZATION

Sport / League	Primary Injury Applications	Competitive Advantage
NFL / Football	Ankle sprains, knee injuries, shoulder separations, post-surgical ACL/MCL recovery, concussion-adjacent soft tissue trauma	Faster return-to-play; reduced IR days; lower painkiller dependency among roster.
NHL / Hockey	Shoulder separations, hip flexor strains, post-surgical recovery, hand/wrist injuries from stick and puck impacts	Maintain roster depth through compressed season schedule; accelerate playoff readiness.
MLB / Baseball	Elbow (UCL) rehab, rotator cuff inflammation, hamstring strains, post-Tommy John recovery support	Protect multi-year contract investments; extend career longevity for pitchers.
MLS / FIFA / Soccer	Hamstring strains, ankle sprains, quadriceps contusions, post-surgical knee recovery	Maintain squad depth across dense match schedules; reduce recurring soft tissue injuries.
NCAA Collegiate	All common soft tissue injuries across football, basketball, soccer, track, wrestling, gymnastics	Multiply athletic training staff effectiveness; gain recruiting advantage with elite recovery technology.
Olympics / Track & Field	Muscle strains, tendon injuries, stress fractures (soft tissue component), post-event recovery	Recovery between heats/events; training load management; zero anti-doping risk.
FIS Skiing / Winter Sports	Knee ligament injuries, ankle trauma, shoulder dislocations, post-crash soft tissue damage	Rapid recovery in remote mountain environments; compact treatment head is facility-portable.
NBA / Basketball	Ankle sprains, knee swelling, finger/hand injuries, post-surgical recovery	Critical for managing load during 82-game season; reduce games missed by starters.

ANTI-DOPING & SUBSTANCE COMPLIANCE

DIAPULSE® IS 100% DRUG-FREE & SUBSTANCE-FREE

No banned substances. No injections. No topical agents. No Therapeutic Use Exemptions required. Fully compatible with WADA, USADA, NFL, NHL, MLB, NCAA, FIFA, and IOC anti-doping protocols.

Diapulse® delivers healing through electromagnetic energy alone. Unlike pharmacological pain management, cortisone injections, platelet-rich plasma (PRP), or other biologic therapies, Diapulse introduces absolutely no foreign substances into the athlete's body. This makes it an ideal recovery modality for organizations operating under strict anti-doping oversight.

For collegiate programs governed by NCAA rules and for Olympic athletes subject to WADA/USADA testing, Diapulse eliminates the compliance risk associated with pain management while delivering clinically proven results.

WHY DIAPULSE® OUTPERFORMS OTHER RECOVERY TECHNOLOGIES

Feature	Diapulse®	Cryotherapy	Wearable PRFE	Ultrasound
Power Output	Up to 975W per pulse	N/A (thermal)	Milliwatt range	Low–moderate
Penetration Depth	Up to 9 inches	Surface only	Superficial	1–2 inches
Clinical Research	186+ peer-reviewed	Limited RCTs	Growing; limited	Moderate
Treats Through Gear	Yes — tape, pads, clothing, casts, braces	No — requires skin exposure	Requires skin contact	No — requires gel + skin contact
Side Effects	None reported (60+ years)	Frostbite risk; discomfort	None reported	Thermal burns possible
Sideline Ready	Yes — immediate application	No — facility required	Yes — limited power	No — facility required

Comfortable. Convenient. Diapulse's combination of clinical-grade power, 9-inch penetration depth, zero-contact application, and six decades of published evidence makes it uniquely suited for the demands of professional and elite athletic environments.

RETURN ON INVESTMENT FOR SPORTS ORGANIZATIONS

EVERY GAME DAY MISSED = LOST REVENUE & COMPETITIVE RISK A single additional game from a key player can be worth millions in ticket sales, sponsorship value, and playoff positioning.

The economics of athletic recovery are straightforward: accelerating an athlete's return to competition by even a single game generates value that far exceeds the cost of the Diapulse® system. Consider the following:

- ✓ **Reduced Injured Reserve / Injured List Days:** Faster edema resolution and pain reduction mean athletes clear medical protocols sooner. The double-blind military RCT (Pennington et al., 1993) demonstrated statistically significant improvement after just one treatment session.
- ✓ **Lower Medical & Pharmaceutical Costs:** Reducing reliance on prescription painkillers, anti-inflammatory injections, and extended physical therapy protocols generates direct savings to the sports medicine budget.
- ✓ **Career Longevity & Asset Protection:** For organizations investing $10M–$300M+ in player contracts, any technology that reduces cumulative soft tissue damage and supports more complete healing directly protects the franchise's most valuable assets.
- ✓ **Post-Career Use:** Retired players can use Diapulse to dramatically reduce pain and increase mobility.
- ✓ **Recruiting & Retention Advantage:** Elite athletes and their agents evaluate an organization's medical and recovery infrastructure. Deploying cutting-edge, clinically validated recovery technology signals a commitment to player welfare that attracts top talent.

KEY FINANCIAL BENCHMARK

Clinical data projects **$65,000+ in annual savings per Diapulse® unit** through reduced treatment time, fewer interventions, and faster athlete throughput.

(Based on a 1991 clinical efficacy report; current savings are expected to be substantially higher.)

REGULATORY & SAFETY PROFILE

Regulatory Item	Detail
FDA Indicated Use	Palliative treatment of postoperative edema and pain in superficial soft tissues
Device Classification	Pre-amendment Class III electromagnetic energy device, granted federal market authorization through FDA grandfathering status on March 27, 1987, permitting commercial marketing as adjunctive therapy for its indicated use
Safety Record	No reported side effects or complications across decades of clinical use. Safe for any body area, any frequency of treatment
Medicare / CMS Reimbursement	CMS established national coverage for electromagnetic stimulation therapy for chronic wound treatment in December 2003 (effective July 1, 2004). Covered indications include chronic Stage III/IV pressure ulcers, arterial ulcers, venous stasis ulcers, and diabetic ulcers
IP & Brand Ownership	Diapulse Technologies, LLC holds all intellectual property, brand assets, and 21 patents. First new devices built in 2025 in modernised solid-state design

A LEGACY TRUSTED BY THE U.S. MILITARY & GLOBAL MEDICINE

The Diapulse prototype was developed in the early 1930s by Dr. Abraham J. Ginsberg, a physician, and Arthur Milinowski, a physicist. Dr. Albert Einstein, a close friend of Ginsberg, reportedly advised in the development of the treatment algorithms. They reported their initial clinical experience and animal research to the New York Academy of Medicine in 1934 and 1940. The original patent was filed on January 22, 1938 and granted as U.S. Patent 2,276,994 on March 17, 1942.

In the 1950s, the driving force shifted to Dr. Jesse Ross, a biophysicist — he had professional associations with Einstein, co-founded the prestigious Bioelectromagnetic Society, and was a NASA consultant. Ross created the Diapulse Corporation of America in Great Neck, NY in 1957, and developed a manufacturing collaboration with Remington Rand (the company behind the UNIVAC computer) to produce the device globally. One notably documented customer was former President Harry Truman in 1966.

The U.S. military's Tri-Service Research Program studied Diapulse in the 1950s and concluded it was safe and effective. The Olympic Committee reportedly ordered Diapulse machines for five Olympic Games; thirty Olympic nations had their own Diapulse machines. Today, Diapulse Technologies, LLC has acquired all intellectual property, brand assets, and 21 patents from the original corporation, reintroducing the system in a modernized solid-state design engineered for reliability in demanding clinical and athletic training environments.

SCHEDULE AN ONLINE MEETING WITH US

We would welcome the opportunity to host your Sports Medical Director and Physical Therapy team for an exclusive online presentation — one that brings to life the remarkable history and compelling clinical outcomes behind Diapulse®.

This session is tailored specifically to your organization, allowing your team to evaluate the device's direct application within your sports injury, wound care, and rehabilitation protocols.

DIAPULSE® TECHNOLOGIES, LLC

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SPORTS MEDICINE & CLINICAL EVIDENCE APPENDIX

Diapulse Technologies | Pulsed RF Energy — Verified Clinical Evidence Base | Updated: April 2026

Disclaimer: PRFE vs. PEMF Terminology Clinical reports or publications that describe the Diapulse® device as employing Pulsed Electromagnetic Field (PEMF) therapy may contain inaccurate terminology. The Diapulse® technology is scientifically defined and regulated as Pulsed Radio Frequency Energy (PRFE), not PEMF. PRFE differs fundamentally from PEMF in pulse characteristics, frequency range, and energy mechanism. The Diapulse® system delivers short, high-peak pulses of non-thermal radio frequency energy specifically designed for therapeutic tissue effects distinct from low-frequency electromagnetic field therapies.

SECTION A — Full Reference Index

Complete bibliography of peer-reviewed PRFE research. All links lead to official PubMed/PMC records.

#	Type	Study / Document	Source	Year	Link
1	RCT	Pulsed High-Frequency EM Energy in Ankle Sprains (n=50) — Pennington et al.	Military Medicine / PubMed	1993	View → PMID: 8441490
2	RCT	Effects of Diapulse on Human Wound Healing: Double-Blind RCT — Goldin et al.	Br. J. Plastic Surgery / PubMed	1981	View → PMID: 7023583
3	RCT	Pulsed High-Frequency EM Energy on Pressure Ulcer Healing — Salzberg et al.	Wounds / PubMed	1995	View → PMID: 7546114
4	Clinical	Treatment of Soft-Tissue Injuries by Pulsed Electrical Energy — Wilson	British Medical Journal / PMC	1972	View → PMC1788965
5	Clinical	Accelerated Healing of Pressure Ulcers (n=22, 100% Healed) — Itoh et al.	Decubitus / PubMed	1991	View → PMID: 1994961
6	Clinical	Treatment of Hand Injuries by Pulsed RF Energy (Diapulse) — Barclay et al.	Physiotherapy / PubMed	1983	View → PubMed Search
7	Review	Pulsed Electromagnetic (Short-Wave) Energy Therapy — Goats	Br. J. Sports Med.	1989	View → PMID: 2670159
8	Research	Effects of Diapulse Pulsed RF Energy on Nerve Repair — Raji & Bowden	J. Hand Surgery (Br)	1983	View → PMID: 6603461
9	Meta	Meta-Analysis of Clinical Efficacy of PRFE Treatment — Guo, Kubat, Nelson & Isenberg	Annals of Surgery / PubMed	2012	View → PMID: 22301609

SECTION B — Sports-Relevant Outcome Studies

Curated PRFE research directly applicable to athletic injury recovery and performance rehabilitation.

Study Title	Key Sports-Relevant Outcome	Link
Treatment of Grade I/II Ankle Sprains — Pennington et al., 1993	A statistically significant ($p < 0.01$) decrease in edema was noted following one single treatment with Diapulse.	PMID: 8441490
Treatment of Soft-Tissue Injuries — Wilson, 1972	Double-blind study showing a definite biological effect on recently injured soft tissues, specifically reducing pain and disability.	PMC1788965
Double-Blind Wound Healing RCT — Goldin et al., 1981	Approximately twice as many patients (59% vs. 29%) achieved over 90% healing in 7 days compared to placebo.	PMID: 7023583
Nerve Repair Experimental Study — Raji & Bowden, 1983	Demonstrated that Diapulse PRFE enhances peripheral nerve regeneration and remyelination.	PMID: 6603461
Pulsed Energy for Sports Injuries — Goats, 1989	Clinical review confirming the therapeutic value of pulsed high-frequency energy for acute athletic trauma.	PMID: 2670159

SECTION C — Clinical Summary by Focus Area

High-level summary mapping each clinical focus area to its primary PRFE evidence source.

Focus Area	Primary Clinical Outcome	Evidence Source
Ankle Sprains	Significant edema reduction ($p < 0.01$) after one session.	PMID: 8441490
Wound Healing	2× faster healing (90% closure) vs. control group.	PMID: 7023583
Nerve Repair	Accelerated remyelination and functional limb recovery.	PMID: 6603461
Pain Reduction	73% pain reduction (VAS); 26% of patients discontinued opioid/NSAID therapy entirely.	PMID: 26705327 PMC4795538

Reference links direct to PubMed, PubMed Central, and EuropePMC primary databases. All PubMed links are verified by PMID. Bagnato et al. (2016) is available as a free PMC article (PMC4795538, PMID 26705327). The original Diapulse Corporation's published bibliography includes 80+ additional studies; the complete bibliography is available upon request from Diapulse Technologies, LLC.