IT COMES AS A SHOCK: KIDNEY REPAIR USING SHOCKWAVE THERAPY

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Short title: Shockwave therapy and kidney disease

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Supplemental materials: 3 supplemental tables

Table S1. Type of shockwave generators

Type of generator	Characteristics	Example of machines
Electrohydraulic	An electrode generates an electrical spark between the tip and a water-filled semi-ellipsoid reflector, which subsequently focuses reflective wave to become a focused shock wave.	Omnispec ED 1000 (Medispec, USA) EvoTron R05 (High Medical Technologies, Switzerland)
Electromagnetic	A primary low-pressure acoustic pulse is generated by movement of a metal membrane away from the electromagnetic-coils. A primary wave then is focused either by acoustic lens (a plane wave) or a cylindrical condenser (a cylinder shaped metal reflector)	Duolith SD1 (Storz medical, Switzerland) Renova (Direx System, Germany) Modulith SLX-2 (Storz Medical AG, Switzerland)
Piezoelectric	A high voltage pulse is applied to a spherical surface laid by a numerous piezoelectric crystals, which results in a low-pressure pulse in the surrounding water. This autofocusing does not need any reflector or condenser to focus the shockwave.	Piezo Wave (Richard Wolf, Germany)

Table S2. Indications and contraindications for medical shock wave therapy

Recommendations	Categories	Conditions
Indications		
Approved standard indications	Chronic tendinopathies	Calcifying tendinopathy of shoulder
		Lateral epicondylitis (Tennis elbow)
	Bone pathologies	Stress fracture
		Avascular bone necrosis without articular involvement
		Delayed bone healing
	Skin pathologies	Delayed or non-healing wounds
		Skin ulcers
		Non-circumferential burn wounds
Common empirically-tested clinical use	Tendinopathies	Rotator cuff tendinopathy
		Foot and ankle tendinopathies
	Bone pathologies	Osgood Schlatter disease
		Tibial stress syndrome
	Muscle pathologies	Myofascial pain syndrome
	Skin pathologies	Cellulite
Exceptional indications-expert indications	Musculoskeletal pathologies	Osteoarthritis
		Dupuytren disease
		Plantar fibromatosis
		De Quervain disease
		Trigger finger
	Neurological pathologies	Spasticity
		Polyneuropathy
		Carpal tunnel syndrome
	Urologic pathologies	Pelvic chronic pain syndrome

		Erectile dysfunction
		Peyronie disease
	Others	Lymphedema
Experimental indication	Others	Ischemic heart disease
		Peripheral neuropathy
Contraindications		
	Radial and focused waves with low energy	Malignant tumor in the treatment area
		Fetus in the treatment area
	High energy focused waves	Lung tissue in the treatment area
		Malignant tumor in the treatment area
		Epiphyseal plate in the treatment area
		Brain or spine in the treatment area
		Severe coagulopathy
		Fetus in the treatment area

Adapted from the International Society for Medical Shockwave Treatment, 2016

Table S3: Ongoing clinical trials of SW in treating parenchymal kidney disease

Clinical trials	Title	Estimated study completion date	Sample size	Kidney disease	Treatment
NCT02515461	Low Energy ShockwaveTherapy (LE-SWT): A Novel Treatment for Chronic Kidney Disease	January 2022	30	Diabetic kidney disease (eGFR 30-60 ml/min/1.73m^2)	MODULITH SLX-F2; 4 Hz (240 shocks/min) x 3000 SW/kidney STORZ MEDICAL AG. Low energy shockwave on day 1,3,7,10,14 and 17 (total of 6 sessions in 3 weeks)
NCT03602807	Safety and Effect of Low-Energy Extracorporeal Shockwave Therapy (ESWT) on the Renal Allograft in Transplant Recipients.	January 2020	40	Kidney transplant allograft	STORZ DUOLITH® SD1 T-TOP "F-SW ultra" Low energy shockwave for 2 treatments /week for 3 weeks; 4Hz x3000 SW/kidney; 0.20mJ/mm^2 applied over the kideny allograft
NCT03445247	Extracorporeal Low-intensity Shockwave in diabetic Nephropathy	June 2020	60	Diabetic kidney disease (eGFR 15-60 ml/min/1.73m^2)	Omnispec; 2 Hz (120 shocks/min) x 1200 SW, 0.1 mJ/mm^2 session for 12 sessions.