26th ISMST

ON-SITE PROGRAM & ABSTRACT BOOK

26TH WORLD CONGRESS OF

THE INTERNATIONAL SOCIETY FOR MEDICAL SHOCKWAVE TREATMENT

6 - 9 JUNE 2024

AMSTERDAM

WWW.ISMST2024.COM

SoftWave | MTS

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WELCOME WORD

ATTENDEES, GUESTS, AND COLLEAGUES—WELCOME!

We are delighted to welcome you to the 26th ISMST World Congress, which is held on June 6-9th 2024 in Leonardo Royal Hotel Amsterdam.
The international ISMST congress is a podium for connection and getting up to date on shockwave therapy. Our intention with this conference is to help those who are new to this medical field gain knowledge and experience this treatment modality, as well as educate those who have extensive knowledge about the winding road to success. Our hope is that by the end of our conference, you gained knowledge on when and how shockwave therapy is used around the world. During this event, we encourage you to make contacts and new connections that will reinforce your feeling of inclusion. If we can be of any assistance in this endeavor, then please feel free to reach out.

Our agenda features expert advice and cutting-edge research that helps us better understand the background and future of shockwave therapy. Though shockwave therapy comes in many forms, certain key features define and underlie the success. For example, to understand its working mechanism we promote basic research, performing good quality research, acknowledge struggle, and foster a climate of encouragement and healthy exchange of knowledge as this is fundamental for becoming even more successful. Our intention is for you to find this conference helpful in moving you toward these goals.

In addition, you will be able to attend instructional courses for both medical doctors and physiotherapists, in which you will be taught about the technical background, its biological efficacy and you will practice its application in various approved indications under experts supervision.
On top of that, the social program will show you the world's most liberal city; Amsterdam. Amsterdam is a well-connected and accessible, digital and social hub. It is well known for its artistic heritage, extensive canals and its houses, but also of its famous beers and DJs. So let yourselves be surprised and enjoy!

We are happy to meet you in person in our wonderful city of Amsterdam to get a taste of the best it has to offer.

On behalf of our local organizing committee,

Marianne

Marianne Koolen
26th International ISMST Congress President

CONTENT

GENERAL INFORMATION

SCIENTIFIC ORGANIZATION

Marianne Koolen
26th International ISMST Congress President

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C-IN
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CONGRESS ORGANIZATION

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Project Manager
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REGISTRATION AND PAYMENT

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Project Manager

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CONGRESS LANGUAGE

The official congress language is English.

CONGRESS WEBSITE

www.ismst2024.com

CONFERENCE VENUE

Leonardo Royal Hotel Amsterdam
Paul van Vlissingenstraat 24
1096 BK Amsterdam

ACCREDITATION

Physiotherapy (Dutch participants)
The congress is only accredited for the general physiotherapy register.
For one congress day, 6 points.
For the two-day congress, 12 points
For the one-day ICC course, 6 points

International (and other participants)
After the congress you will receive a certificate of Attendance. With this document you can register your participation for accreditation purposes in your own country.

LOCAL COMMITTEE

MARIANNE KOOLEN
CONGRESS PRESIDENT –
PROGRAM & SOCIAL EVENTS

CAS WOLBERT
COMMUNICATION

AD EVERS
CONGRESS FINANCES
& PARTNERSHIPS

SANDER GREVE
CONGRESS PROGRAM

JOOST NABBEN
CONGRESS PARTNERSHIPS
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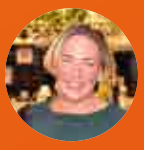

ANNET VAN LIMBURG
BUREAU PRÉ
CONGRESS MANAGEMENT
& SECRETARY

TEREZA DVOŘÁKOVÁ
CONGRESS PROGRAM (C-IN)

SCIENTIFIC COMMITTEE

DR. CARLOS LEAL

DR. KARSTEN KNOBLOCH

DR. RAINER MITTERMAYR

DR. WOLFGANG SCHADEN

DR. MARIANNE KOOLEN

MSC. SANDER GREVE

DR. KWANG SUN PARK

DR. TOMAS NEDELKA


I amsterdam.
WELCOME TO

AMSTERDAM

ISMST 2024 SCIENTIFIC PROGRAM

THURSDAY JUNE 6TH

09:00–17:00	ISMST ANNUAL BOARD MEETING
16:00 – 20:00	REGISTRATION OPEN – LEONARDO'S BAR
18:00–20:00	WELCOME RECEPTION AT LEONARDO'S RESTAURANT

FRIDAY JUNE 7TH

7:30 - 18:00	REGISTRATION & INDUSTRIAL EXHIBITION FOYER AND AMSTEL 1

OPENING CEREMONY
08:45 - 09:05 Amstel 2&3

Marianne Koolen (Netherlands)
Cas Wolbert (Netherlands) Impuls - Shockwave therapy in the Netherlands

PLENARY SESSION 1 | BASIC RESEARCH
MODERATOR:
09:05 - 10:35 Amstel 2&3

Moderator: Rainer Mittermayr (Austria)
Chair: Johannes Holfeld (Austria)
Chair: Wolfgang Schaden (Austria)

09:05	Direct cardiac shockwave therapy – insights from the CAST-HF trial	Keynote: Johannes Holfeld (Austria)
09:30	Therapeutic transdifferentiation of fibroblasts to functional endothelial cells	Michael Graber (Austria)
09:40	Pulsed electromagnetic fields: A passive effect of hydroelectric shockwaves	Jonas Flatscher (Austria)
9:50	Investigating Plasma Bubble Variations: Classification and Shape Analysis of Electrohydraulic Shockwave Signals	Hannah Janout (Austria)
10:00	Shockwaves in Neuromechanobiology	Axel Martinez (USA)
10:10	Mechanical stimulation of vascular recovery in non-ischemic heart failure (presenter: Johannes Holfeld)	Invited: Felix Naegele
10:35	**Discussion – Q&A**	

Break: Coffee Break
10:45 - 11:05 Amstel Foyer

PLENARY SESSION 2 | MUSCULOSKELETAL ESWT INDICATIONS
11:05 - 12:55 Amstel 2&3

Moderator: Marianne Koolen (Netherlands)
Chair: José Eid (Brazil)
Chair: Carlos Leal (Colombia)

11:05	Rotator cuff tendinitis calcarea – Fractional therapy with focused extracorporeal shock waves; A Clinical Report on Validity and Reliability	Keynote: Ibrahim Kulac (Austria)
11:30	Effects of individual shock wave therapy vs celecoxib on hip pain caused by femoral head necrosis	Invited: Xing Gengyan (China)

11:55	Effectiveness of Focused extracorporeal shockwaves on myofascial tissue in low back pain	Federico Giordani (Italy)
12:05	Is ESWT able to change morphology of the tendon in patellar tendinopathy? A longitudinal cohort study with three-month follow-up	Jakub Katolicky (Czech Republic)
12:15	Precision and functional application of ultrasound-guided extracorporeal shock wave therapy in neuromusculoskeletal pathologies: A multicenter retrospective study	Lev Kalika (Ukraine)
12:25	Evaluation of the application of radial extracorporeal shock wave therapy in patients with knee osteoarthritis	Biljana Kalchovska (North Macedonia)
12:35	The effectiveness of ESWT on abductor injury after the IM nailing comparison study between ESWT group and non-ESWT gorup	Yonghyun Yoon (Korea Republic of)
12:45	**Discussion – Q&A**	

Break: Lunch & Poster Session
12:55 - 14:15 Amstel Foyer

PLENARY SESSION 3 | ESWT IN NEUROLOGY 14:15 - 15:35 Amstel 2&3	Moderator: Carlos Leal (Colombia) Chair: Karsten Knobloch (Germany) Chair: Tomáš Nedělka (Czech Republic)

14:15	Shockwaves and neuroplasticity - from tendon injuries to brain stimulation	Keynote: Tomáš Nedělka (Czech Republic)
14:40	Transcranial Pulse Stimulation improves cognition and mood in Alzheimer´s disease: Results from a case-control study	Invited: Karin Freitag (Spain)
15:05	Results of ESWT, according to the ICF, in patients with spasticity caused by stroke: A systematic review and impact statement	Thijs Janssen (Netherlands)
15:15	Results of ESWT, according to the ICF, in patients with spasticity caused by stroke: A systematic review and impact statement	Thijs Janssen (Netherlands)
15:25	**Discussion – Q&A**	

Break: Coffee Break
15:35 - 15:55 Amstel Foyer

PLENARY SESSION 4| ESWT IN PAIN MANAGEMENT 15:35 - 17:15 Amstel 2&3	Moderator: Hannes Müller-Ehrenberg (Germany) Chair: Ludger Gerdesmeyer (Germany) Chair: Sergej Thiele (Germany)

15:55	Understanding Pain	Keynote: Ludger Gerdesmeyer (Germany)
16:20	Shockwave for Muscle and Connective Tissues- an Update of Myofascial Shockwave Therapy	Invited: Hannes Müller-Ehrenberg (Germany)
16:45	Focused extracorporeal shock wave therapy for spontaneous osteonecrosis of the knee	Takuro Sugiyama (Japan)
16:55	Application of extracorporeal shock wave therapy for plantar fasciitis and hamstrings muscle injury	Joji Iwase (Japan)
17:05	**Discussion – Q&A**	

SPECIAL SESSION: ANNUAL GENERAL MEETING (AGM)
17:15 - 18:00

NETWORKING DINNER AMSTERDAM EDITION
19:30 – 23:30

ISMST 2024 SCIENTIFIC PROGRAM

SATURDAY JUNE 8TH

08:00–18:00	REGISTRATION & INDUSTRIAL EXHIBITION FOYER AND AMSTEL 1

PLENARY SESSION 5: ESWT IN UROLOGY
09:00 - 10:30 Amstel 2&3

Moderator: Jens Rassweiler (Austria)
Chair: Irwin Goldstein (USA)
Chair: Michael Strom (USA)

09:00	Low intensity shockwave therapy for erectile dysfunction: a sham-controlled randomized trial concomitantly examining lower urinary tract symptoms	Keynote: Irwin Goldstein (USA
09:25	EAU-expert Meeting at UroTec 24 on Extracorporeal shock wave therapy in Urology	Invited: Jens Rassweiler (Austria)
09:50	Comparison of three focal shockwave protocols for the treatment of erectile dysfunction. Randomized clinical trial	Ramón Almendro (Spain)
10:00	A chart review of patients with hormonally-mediated vestibulodynia treated with low-intensity shockwave therapy	Sue Goldstein (USA)
10:10	Single session protocol for LiESWT ED treatment. Could it be appropriate and sufficient?	Igor Motil (Czech Republic)
10:20	**Discussion – Q&A**	

Break: Coffee Break
10:30 - 10:50 Amstel Foyer

PLENARY SESSION 6: ESWT IN SPORTS MEDICINE
10:50 - 12:30 Amstel 2&3

Moderator: Marianne Koolen (Netherlands)
Chair: Carlos Leal (Colombia)
Chair: Karsten Knobloch (Germany)

10:50	ESWT in High Level Athletes	Keynote: Karsten Knobloch (Germany)
11:15	Complications and Poor Results of ESWT in Sports Medicine	Invited: Carlos Leal (Colombia)
11:40	Focal extracorporeal shockwave therapy in treating symptomatic post-surgical patients in a Middle Eastern Sports Medicine Hospital	Aston Ngai (Qatar)
11:50	A novel attempt of conservative therapy for capitellar osteochondritis disse-cans using extracorporeal shock wave therapy	Koji Hara (Japan)
12:00	A case of distal insertional adductor tendinopathy in young footballer reveals a chondroblastic osteosarcoma through ultrasound for guided focused ESWT	Marta Andrighetti (Italy)
12:10	Combined therapy of platelet-rich plasma and extracorporeal shock wave treatment for fractures	Toru Omodani (Japan)
12:20	Discussion – Q&A	

Break: Lunch & Poster Session
12:30 - 13:45 Amstel Foyer

Sponsor meeting - De Dam
13:00 – 13:30

PLENARY SESSION 7: ESWT IN WOUNDS, SCARS & LYMPHATICS 13:45 - 14:55 Amstel 2&3		Moderator: Carlos Leal (Colombia) Chair: Wolfgang Schaden (Austria) Chair: Karin Freitag (Spain)
13:45	ESWT for Skin Rejuvenation and Cellulite	Keynote: Karsten Knobloch (Germany)
14:10	Advancements in Shockwave Therapy for Wound Management: A Comprehensive Update	Invited: Rainer Mittermayr (Austria)
14:35	Acoustic shockwave therapy in recurrent metastatic breast cancer	John Mullins (USA)
14:45	**Discussion – Q&A**	

Break: Coffee Break
14:55 - 15:15 Amstel Foyer

PLENARY SESSION 8: NEW DEVELOPMENTS 15:15 - 16:45 Amstel 2&3		Moderator: Shin Who Park (Korea) Chair: Wolfgang Schaden (Austria) Chair: Vinzenz Auersperg (Austria)
15:15	The Future of Shockwave Therapy	Keynote: Wolfgang Schaden (Austria)
15:40	Results of ESWT, according to the ICF, in patients with knee osteoarthritis: A systematic review	Invited: Thijs Janssen (Netherlands)
16:05	Testing, Teaching, Treating - A new approach towards better ESWT application	Paul Slezak (Austria)
16:15	A novel use of shockwave therapy for driveline complications in LVAD and other MCS patients	John Mullins (USA)
16:25	SWT: It's time to put the gender on the agenda	Maximilian Murtinger (Austria)
16:35	Discussion – Q&A	

Special Session: Closing Ceremony
16:45 – 17:15 Amstel 2&3

Get together Beer brewery Troost
19:00 – 22:00 Amstel 2&3

ISMST - ICC AMSTERDAM 2024
FOR PHYSIOTHERAPISTS

SUNDAY JUNE 9TH

8:00	Opening	
8:10	History and Physics of shockwaves	Dr. Vinzenz Auersperg
8:30	Biological Effects of shockwaves	Prof. Wolfgang Schaden
8:50	Complications of treatment	Dr. José Eid
9:00	Basic principles of Application	Sergej Thiele
9:10	ESWT as a Team Player	Prof. Ludger Gerdesmeyer
9:25	Q&A - Round Table	All Speakers
9:45	PRESENTATION OF SPONSORS	
10:00	COFFEE BREAK	
10:40	RPW for MPS: neck and shoulder	Sergej Thiele
11:00	RPW on Spasticity	Dr. Karin Freitag
11:15	RPW for Tendinopathy of the shoulder	Sander Greve
11:30	RPW for elbow and hand pathologies	Prof. Karsten Knobloch
11:50	WORKSHOP UPPER EXTREMITY	
12:30	LUNCHBREAK	
13:30	RPW for MPS: lumbal region	Dr. Hannes Müller-Ehrenberg
13:55	RPW for GTPS	Dr. Hannes Müller-Ehrenberg
14:10	RPW for Patellar Tendinopathy	Prof. Carlos Leal
14:25	WORKSHOP LOWER EXTREMITY	
15:05	COFFEE BREAK	
15:35	RPW for Achilles Tendinopathy	Cas Wolbert
15:55	RPW for Plantar Fasciitis	Dr. Manuela Cabrera Freitag
16:15	RPW for Muscle sprain	Sergej Thiele
16:30	Research an future indications	Prof. Carlos Leal
16:50	WRITTEN MULTIPLE CHOICE TEST	

ISMST - ICC AMSTERDAM 2024
FOR PHYSICIANS

SUNDAY JUNE 9TH

8:00	Opening	
8:10	History and Physics of shockwaves	Dr. Vinzenz Auersperg
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9:25	Q&A - Round Table	All Speakers
9:45	PRESENTATION OF SPONSORS	
10:00	COFFEE BREAK	
10:40	ESWT for Calcifying Tendinopathy of the shoulder	Prof. Ludger Gerdesmeyer
11:00	ESWT for forearm pathologies (Elbow/Wrist/Hand)	Prof. Karsten Knobloch
11:20	ESWT for myofascial pain syndrome: lumbal region/GTPS	Dr. Hannes Müller-Ehrenberg
11:40	ESWT for Patellar Tendinopathy	Prof. Carlos Leal
11:55	ESWT for Gonarthrosis	Dr. José Eid
12:10	ESWT for Achilles and Plantar fasciitis	Dr. Manuela Cabrera Freitag
12:30	LUNCHBREAK	
13:30	WORKSHOP UPPER EXTREMITY	
14:10	ESWT for bone pathologies	PD Dr. Rainer Mittermayr
14:30	ESWT for skin indications/wound	PD Dr. Rainer Mittermayr
14:45	ESWT for aesthetic indications	Prof. Karsten Knobloch
15:05	COFFEE BREAK	
15:35	WORKSHOP LOWER EXTREMITY	
16:15	ESWT for neurology	Dr. Karin Freitag
16:30	Research an future indications	Prof. Wolfgang Schaden
16:50	WRITTEN MULTIPLE CHOICE TEST	

POSTER SESSION
ROUND 1 – AMSTEL 1

FRIDAY JUNE 7TH - 13:15 - 13:35

SATURDAY JUNE 8TH - 12:50 - 13:10

Conservative treatment with and without focused shock wave therapy for osteochondritis dissecans of the humeral capitellum in baseball players
Yusuke Iwahori (Japan)

Extracorporeal Magnetotransduction Therapy (EMTT) - Shockwave Therapy (ESWT) For Thigh Pain
Kunal Parmar, Robert Monaco, Stan Yoo, Dean Padavan, Martins Damion (USA)

Assessment by grayscale and color doppler ultrasound after low intensity shockwave treatment of the erect penis using an air reflector
Irwin Goldstein, Sue Goldstein (USA)

Extensive burns treated with extracorporeal shock waves therapy: A clinical case
Maria Martin Lopez De Abajo, Ros Dopico Lucía, Serrano Sáenz de Tejada Francisco de Borja, Ortiz Cabrero Laura (Spain)

Effects of extracorporeal shock wave therapy in an unusual case of Ledderhose disease
Federica Fulceri, Larisa Ryskalin, Gabriele Morucci, Francesco Busoni, Paola Soldani, Marco Gesi (Italy)

Treating greater trochanter pain syndrome (GTPS) with a focus on myofascial components: A Longitudinal study in private practice
Jens Erik Jorgensen, Jens Kristinsson, Jane Andreasen, Carsten M Moelgaard, Angela Fearon (Denmark)

Focused shockwave therapy for trigger finger: A clinical study
Yasuhiro Nishimori (Japan)

Successful application of long post-Covid vaccine patient with significant fatigue and post-exertional malaise using pulsed electromagnetic fields: A case study
Sharon Reynolds-Kyle (USA)

POSTER SESSION
ROUND 2 – AMSTEL 1

FRIDAY JUNE 7TH - 13:45 - 14:05

SATURDAY JUNE 8TH - 13:15 - 13:35

Focused extracorporeal shock wave is effective for fatigue fractures of the proximal phalanges of bilateral great toes: A case report
Kenji Yokoyama, Tetsuya Matsuura, Joji Iwase, Koichi Sairyo (Japan)

Treating bone marrow edema in primary care – Is it feasible? A case study
Jens Erik Jorgensen, Sinan Mouaayad Abdulaimma Said, Carsten M. Moelgaard (Denmark)

Return to sports of navicular bone stress injuries using focused shock wave
Hirofumi Tanaka, Hirofumi Katsutani, Haruaki Sugino, Koji Hara, Yasuhiro Mitsui, Kosuke Hyakutake, Tsukasa Kumai (Japan)

Bone marrow edema in distal Humerus which successfully treated by ESWT
Norimasa Takahashi, Kenji Takahashi (Japan)

The efficacy of focused extracorporeal shockwave therapy for fabella syndrome: A case report
Larisa Ryskalin, Federica Fulceri, Gabriele Morucci, Francesco Busoni, Paola Soldani, Marco Gesi (Italy)

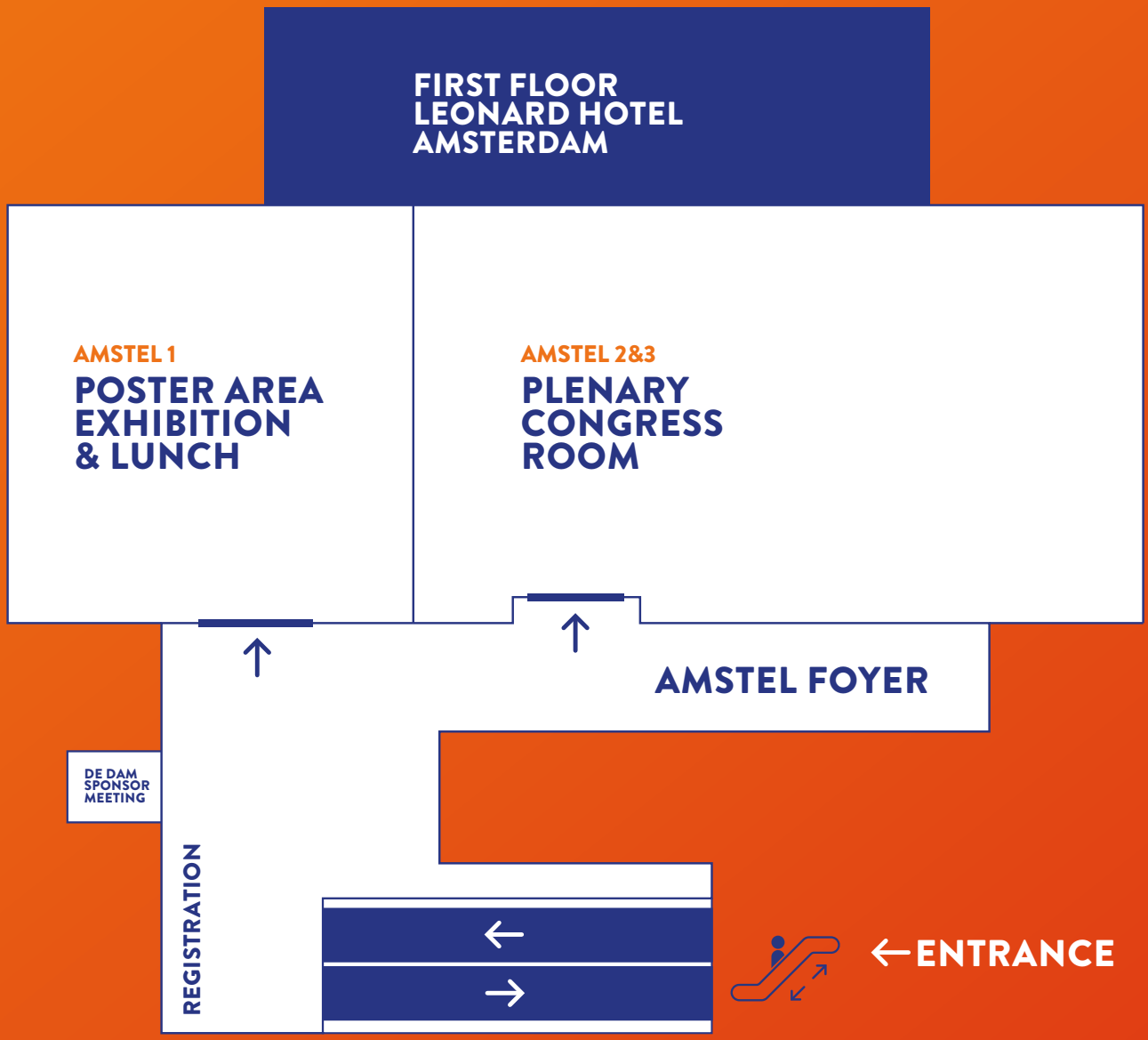
Common misinterpreted adverse effects when treating calcific tendinalgia - A serie of cases where ultrasonography made a big difference
Jens Lundgren, Jesper Danielson, Martin Cronholm (Sweden)

Combined use of LiESWT/ EMTT in the treatment of pelvic floor dysfunction resulting in Stress Urinary Incontinence: A case report
Sharon Reynolds-Kyle (USA)

Low intensity shockwave therapy for erectile dysfunction: results of the sham treatment
Sue Goldstein, Irwin Goldstein, Noel Kim (USA)

Randomized controlled trial for use of low intensity shockwave for patients with dyspareunia
Stacey Roberts, Christine Cabelka, Holly Tanner, Heather Jeffcoat, Stacey Futterman Tauriello (USA)

CONGRESS VENUE



* The ICC course will take place on the ground floor - follow the signs of Prinsengracht and Singel

ADDITIONAL INFORMATION

PHOTOGRAPHIC AND VIDEO DOCUMENTATION

By participating, you agree to the present and future use of the pictures and videos taken during the event. It is prohibited to take pictures and videos from scientific presentations.

LEONARD HOTEL
AMSTERDAM

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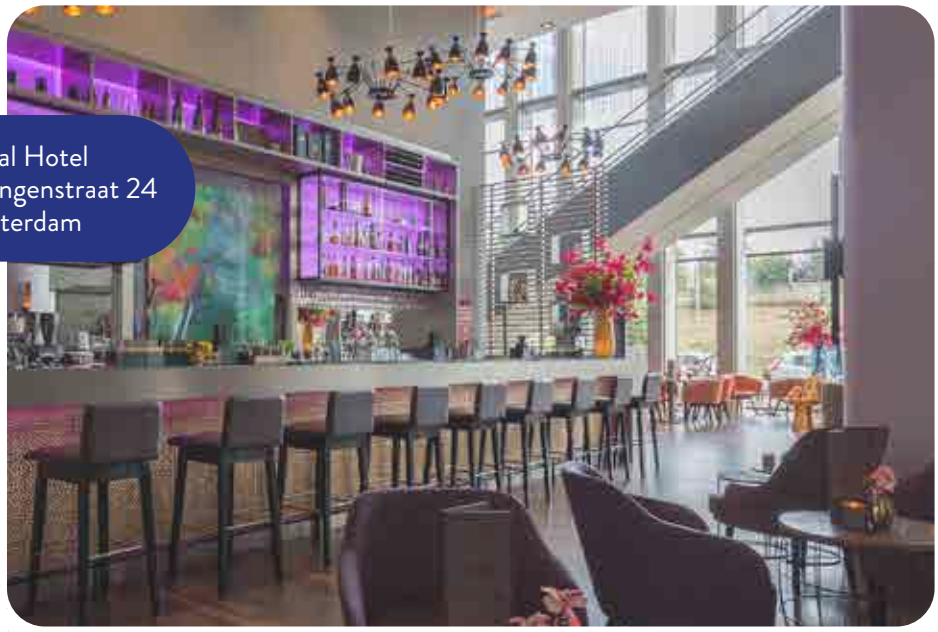
Paul van Vlissingenstraat 24
1096 BK Amsterdam



LIST OF MODERATORS

Auersperg Vinzenz	Pyhrn-Eisenwurzen-Klinikum Kirchdorf und Steyr	Austria
Eid José	Hospitl Hcor	Brazil
Freitag Karin	Clínica DKF	Spain
Gerdesmeyer Ludger	University Kiel	Germany
Goldstein Irwin	Alvarado Hospital	USA
Holfeld Johannes	Medical University of Innsbruck	Austria
Knobloch Karsten	SportPraxis Prof. Knobloch	Germany
Koolen Marianne	UMC Utrecht	Netherlands
Leal Carlos	Bosque University	Colombia
Mittermayr Rainer	Ludwig Boltzmann Institute for Traumatology	Austria
Müller-Ehrenberg Hannes	Orthopädische Praxis	Germany
Nedělka Tomáš	Czech Technical University	Czech Republic
Park Shin Who	Seoulsun Orthopaedics Clinic Seoul	Korea
Rassweiler Jens	Danube Prvate University Krems	Austria
Schaden Wolfgang	Ludwig Boltzmann Institute for Traumatology	Austria
Strøm Michael	MS Insight	Denmark
Thiele Sergej	Chimanos – Health Care Centre	Germany

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+49 72 31 - 56 36 46 fax
info@elvation.de
www.elvation.de

SOCIAL EVENTS

THURSDAY JUNE 6TH 18:00 – 20:00

WELCOME RECEPTION RESTAURANT HOTEL LEONARDO

ground floor (included in the registration fee)

FRIDAY JUNE 7TH 19:30 – 23:30

NETWORK EN DINNER PARTY – OCEAN DIVA

The Oceandiva ships bring together the best of multiple worlds, water, docks, entertainment and fun! After boarding we sail through the waters and docks of Amsterdam, serving a delicious dinner with amazing views and good entertainment.

PRICE: € 130
(only with registration before the 5th of June)
The location is easy accessible by public transport or taxi/Uber.
Check our website for more information.

Please board at: Steiger 14 before 20:00.
Adress: De Ruijterkade 14,
1011 AA Amsterdam

SATURDAY JUNE 8TH 19:00 – 22:00

GET TOGETHER AT BREWERY TROOST

Brewery Troost is located in a former monastery in the typical Amsterdam district the Pijp. You will enjoy organic beers, homemade soft drinks and cozy food in an authentic Amsterdam setting.

PRICE: € 60
(only with registration before the 25th of May)
The location is easy accessible by public transport or taxi/Uber.
Check our website for more information.

Adress: Cornelis Troostplein 23, 1072 JJ Amsterdam

AMSTERDAM INFO

HOW TO REACH LEONARDO ROYAL HOTEL AMSTERDAM BY PUBLIC TRANSPORT?

Adress: Leonardo Royal Hotel
Paul van Vlissingenstraat 24
1096 BK Amsterdam

FROM AMSTERDAM CENTRAL STATION:
Take metro line 51 in direction Isolatorweg and stop at station Overamstel.
The hotel is opposite of the station. It takes around 15 minutes. Last metro is around midnight.

FROM SCHIPHOL AIRPORT:
Take the train to Amsterdam Central station and follow the route above. It takes around 35 minutes.

OVPAY – PUBLIC TRANSPORT
OVpay is the new way to check-in and out of public transport with your debit or credit card. Simply hold your card against the card reader on the bus, tram and metro. The system will beep once you have checked in correctly. Be sure to check out with the same card at your destination. More information about Amsterdam and the public transport options you can find here **www.gvb.nl/en**

TAXI'S / UBER
Official taxis have blue license plates, an official sign on the roof and offer minimum quality standards set by the municipality. You can also use the services of Uber.

Taxicentrale Amsterdam (TCA) (with online booking service) – 020 777 7777
Schipholtaxi – 020-303 7200

Or ask the hotel reception to make a reservation.

HOTELPARKING
Hotelparking is possible at Leonardo's Hotel at a reduced fee of € 20 per day.
If you stay in the hotel, you will receive a link for an online incheck before arrival. With this link you can also reserve a parking spot. If you are a day visitor, please go to the hotel reception to pay your parking ticket (and not to the paymachine).

DISCOVER AMSTERDAM WITH THE I AMSTERDAM CITY CARD
The I amsterdam City Card offers a unique way to explore Amsterdam. You get access to all major highlights and more than 70 museums, city-wide public transport, a canal cruise and bicycle rent. You can order your card online for 24,48,72,96 or 120 hours. More information can be found here **www.iamsterdam.com/en**

It can be very busy in Amsterdam during the weekend, if you want to be sure of an entrance ticket reserve them upfront at the popular museums like Rijksmuseum, Stedelijk Museum, Anne Frank Huis etc.

EMERGENCY NUMBER
112 European Emergency Number

Combined Therapy

Focused Shock Wave Therapy

Radial Shock Wave Therapy

Extracorporeal Magnetotransduction Therapy

STORZ MEDICAL

The Shock Wave Company

As a reliable partner to physicians, we are shaping a piece of medical progress – in the service of new therapeutic procedures. The goal of our physicists and engineers is to further develop shock wave technology, to develop new device concepts and to open up new indications in close cooperation with leading medical institutes.

ESWT – Extracorporeal Shock Wave Therapy

The wide range of indications in orthopaedics, physiotherapy and rehabilitation medicine is ideally covered by STORZ MEDICAL with focused and radial shock wave therapy. This is precisely that makes the DUOLITH® SD1 »ultra« combined shock wave device and the radial MASTERPULS® line the most successful ESWT systems on the market today.

EMTT – Extracorporeal Magnetotransduction Therapy

EMTT with the MAGNETOLITH® is a non-invasive, outpatient treatment solution in which painful areas of the body are treated with high-energy magnetic pulses using a high oscillation frequency. EMTT opens up new possibilities in regeneration and rehabilitation.

Convince yourself: Experience our products and meet our product specialists in the ISMST industrial exhibition hall.

STORZ MEDICAL AG · Lohstampfestrasse 8 · 8274 Tägerwilen · Switzerland
Tel. +41 (0)71 677 45 45 · info@storzmedical.com · www.storzmedical.com

ORAL PRESENTATION SESSION 1:BASIC RESEARCH

PULSED ELECTROMAGNETIC FIELDS: A PASSIVE EFFECT OF HYDROELECTRIC SHOCKWAVES.

Jonas Flatscher[1], Cyrill Slezak[1], Paul Slezak[1]
[1]Ludwig Boltzmann Institut für Traumatologie, Extracorporeal Shockwave, Wien, Austria

INTRODUCTION

Literature reviews in the field of biophysical therapies reveal a wide range of overlapping clinical benefits and biological mechanisms. Among the pulsed focused field therapies there is an intriguing question as to whether there is a synergistic benefit of extracorporeal shockwave therapies (ESWT) and pulsed electromagnetic field (PEMF) therapies. The shared clinical indication for both treatment modalities may however also be indicative of a common underling mechanism.

MATERIAL & METHOD

Using specialised electro-magnetic and hydrophone sensors on a 3D positioning table, we are able to quantify the therapeutic physical fields generated by each applicator, giving an opportunity for a side-by-side comparison of ESWT and PEMF treatment fields. The analysis includes comparison of the volumetric envelope parameters (i.e. max/min intensity, energy flux, gradient) and temporal aspects (i.e. duration, frequency, repletion rate,...) of the applied fields. A critical literature comparison of proposed tissue interactions, in particular mechanotransduction and induced piezoelectrically generated currents, sets the staring off point for a systematic categorization of underlying biological mechanisms. This approach will allow for an evaluation of any clinically relevance (particularly in wound healing) of electromagnetically generated fields during the use of hydroelectrically generated shockwaves.

RESULTS

The hydraulic shockwave device is using a high voltage spark to generate a plasma bubble, which expands and collapses to create an acoustic shockwave. This form of generation has two side effects, which often stay unnoticed: For one, the discharge emits a bright light, and for two, a high frequency magnetic field is induced. We find the latter, due to not reaching the motor threshold to stimulate the muscle to create a visible movement, to remain mostly unnoticed. Similarly, the high light intensity is offset by its short duration which makes a direct comparison to light therapies difficult.

DISCUSSION

While the electro-hydraulically generated ESWT electromagnetic fields cannot compete in intensity with those of specialised, high strength PEMF devices, which are capable of reaching the Tesla range, the measured field is comparable to weaker magnetic field devices on the market. Of particular interest is the similar pulse repetition frequencies as well as the field frequency.

TECHNOLOGY: Focused Shockwave
DEVICE AND COMPANY: MTS Orthogold 100
COI: No conflict of interest

THERAPEUTIC TRANS DIFFERENTIATION OF FIBROBLASTS TO FUNCTIONAL ENDOTHELIAL CELLS

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INTRODUCTION

Reprogramming of cardiac fibroblasts towards functional endothelial cells is a promising strategy for the vascular regeneration of ischemic myocardium. Stimulation of inflammatory signaling (e.g. by activation of the pattern recognition receptor Toll-like receptor 3 (TLR3)) is required for effective chromatin remodelling and nuclear reprogramming. Mechanical conditioning of myocardium via shock wave therapy (SWT) has been shown to activate TLR3. We hypothesized that activation of TLR3 via SWT might facilitate reprogramming of fibroblasts towards endothelial cells in ischemic myocardium.
Material & Method (please include the kind of device you are using)Human cardiac fibroblasts were treated with SWT or TLR3 agonist poly(I:C) in presence of a specific induction medium known to promote endothelial lineage and analysed for the expression of endothelial-specific markers. Induced endothelial cells (iECs) were subjected to functional endothelial cell assays including NO production and tube formation. iECs were suspended in matrigel and injected subcutaneously into NGS mice. Lineage tracing was performed in a transgenic mouse model of Fsp1-Cre/LacZ mice after coronary occlusion and SWT. Myocardial scarring was evaluated histologically, left ventricular (LV) function was assessed via transthoracic echocardiography. Chromatin remodeling and epigenetic plasticity were evaluated via Western Blot and ATAC sequencing. Single nuclei RNA Sequencing (snRNASeq) of infarcted hearts was performed to assess cell-specific gene expression after SWT.

RESULTS

SWT activated TLR3 signaling and triggered the expression of endothelial genes in a TLR3 dependent fashion. SWT resulted in higher numbers of iECs. iECs were capable of producing endothelial nitric oxide (NO) and of forming tube-like structures. In vivo, the subcutaneous injection of iECs resulted in higher numbers of vessels and improved perfusion in a Matrigel plug assay. In a lineage tracing experiment in Fsp1-Cre/LacZ mice, we found higher numbers of LacZ/CD31 positive cells after coronary occlusion and subsequent SWT indicating trans differentiation in vivo. Myocardial scar size was reduced after SWT, whereas LV function was improved. Mechanistically, SWT enhanced epigenetic plasticity via the TLR3 – NFKB - IL6 –STAT3 – PRDM14 axis. SWT and Poly(I:C) induced significant changes in chromatin organization, with chromatin being more accessible after both treatments in 1705 genomic regions. RNA velocity analysis of snRNAseq revealed enhanced cellular transition of mesenchymal cells towards endothelial-like subtypes in SW- treated hearts.

DISCUSSION

We provide evidence for the induction of endothelial trans differentiation in ischemic myocardium via mechanical stimulation. SWT could become a feasible technology to efficiently translate the concept of trans differentiation into a clinical setting.

TECHNOLOGY: Focused Shockwave
DEVICE AND COMPANY: -
COI: No conflict of interest

ORAL PRESENTATION SESSION 1:BASIC RESEARCH

INVESTIGATING PLASMA BUBBLE VARIATIONS: CLASSIFICATION AND SHAPE ANALYSIS OF ELECTRO-HYDRAULIC SHOCKWAVE SIGNALS

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INTRODUCTION

Unlike electromagnetic (EM) or piezoelectric (PE) devices, which create "ordinary" soundwaves which build up to form a shockwave while traveling due to nonlinear effects, the electrohydraulic (EH) generator produces a shockwave instantly during a discharge between two electrodes. These stochastically generated EH shockwaves will individually vary in shape, pressure, duration, and energy. These variations in the shockwave form are significantly influenced by minor deviations in the triggered plasma bubble's position about the focal point and potential disruptions in the spherical symmetry during cavitation.

The role of variability versus homogeneity in the treatment parameters of many physical therapies remains an important, but unanswered question. Considering the significant variations in EH signals (examples shown in Figure 1) and their widespread clinical use raise the question of the impact on therapeutic efficacy. However, before any meaningful clinical investigation, a clear distinction between stochastic EH therapy and a more predictable patterned therapy (EM, PE) has to be established. A nuanced understanding of these differences, especially through analysing the stochastic aspects of EH signals across the electrodes' lifespan, could unlock pivotal clinical insights into improving shockwave therapy.

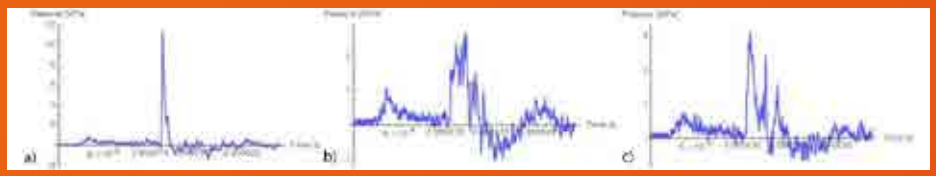

Figure 1: A range of EH signal shapes observed under identical experimental parameters. Image (a) portrays a well-defined shockwave signal, whereas images (b) and (c) illustrate pressure waves ensuing from misaligned plasma bubbles.

MATERIAL & METHOD

In our research, we comprehensively explored shockwave shapes and their points of origin. As part of this, we developed an automated workflow that facilitates successfully identifying and extracting shockwave signals from multilateral recordings. Advanced signal processing algorithms and machine learning techniques were used in creating an efficient and streamlined automated analysis process.

RESULTS

Leveraging our machine learning algorithms, we classified various topologies of shockwave forms, allowing us to elucidate correlations between signal shape and plasma bubble origin. Due to the inability to observe the origin position directly, we designed a specialized measurement setup involving four sensors. These sensors permitted us to calculate the plasma bubble origin position using multilateration techniques, considering the primary wave's differential time of arrival.

DISCUSSION

We have established a workflow to numerically classify EH shockwave shapes and pinpoint their origin position, especially documenting the effect of the lifecycle of the electrodes. Applying this approach to different generating technologies and applicators will provide the basis for improved parameter descriptions in future clinical investigations. This enhanced understanding of stochastic therapies could provide crucial insights into potentially clinically relevant mechanisms, thus refining therapeutic outcomes.

TECHNOLOGY: Focused Shockwave **DEVICE AND COMPANY:** Electrohydraulic, MTS **COI:** No conflict of interest

SHOCKWAVES IN NEURO MECHANOBIOLOGY

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INTRODUCTION

Motor control dysfunction after ischemic and hemorrhagic stroke is common but detrimental for patient recovery. Stroke Sequela can result in hemiplegia, hypokinetic and hyperkinetic movement disorders autonomic dysfunction, hemiparesis and others. Suprasegmental neuronal modulation has been investigated in the last 20 years and proved positive results in different neurological condition. Therapies aiming to restore motor function are limited and new advances are needed in the medical field.

MATERIAL & METHOD

In this randomized, single-center trial 10 ischemic and hemorrhagic stroke patients presenting motor control disturbances participated. Groups were divided into Standard of care (n=5) and Standard of Care and SWT (n=5) receive focused shockwaves utilizing the Softwave TRT dermagold 100 electro-hydraulic device. Patients were treated with 1000 pulses for 2 sessions at a 2.5HZ frequency, each therapy was performed a week apart, aimed to the posterior parietal sensory strip. Energy influx used was 5-7 energy level. Significant motor control differences were noted after 2 sessions of therapy were applied. Function was measured by Ashworth scale, ROM test, Neurological examination, the Oxford scale, Montreal cognitive assessment, UPDRS scales were used pre and post treatment.

RESULTS

Functional Improvement of both upper or lower limb control were noted at the first visit. Initiation of movement and decreased spasticity was achieved and patient showed a decreased in symptoms, allowing better control of limbs indicating a change in the frequency of neuronal firing helping and reestablishing neuronal motor pathways affected by the ischemic or hemorrhagic stroke. Ashworth scale, ROM test Oxford scale, Montreal cognitive assessment and UPDRS showed improved scores compared to the traditional therapy group which would.

DISCUSSION

SWT could develop effective treatments options for patients suffering post ischemic or post hemorrhagic motor control disturbances.

TECHNOLOGY: Focused Shockwave
DEVICE AND COMPANY: Softwave dermagold 100
COI: No conflict of interest

ORAL PRESENTATION SESSION 1:BASIC RESEARCH

MECHANICAL STIMULATION OF VASCULAR RECOVERY IN NON-ISCHEMIC HEART FAILURE

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INTRODUCTION

Heart failure is a severe socio-economic burden and remains a leading cause of death worldwide. Available therapies for both ischemic and non-ischemic heart failure are palliative. In previous studies, we were able to demonstrate that shockwave therapy is highly effective in increasing vascular density by inducing angiogenesis, making it an appealing treatment option for ischemic heart disease. The effects on non-ischemic heart failure, caused by e.g., valvular heart diseases are unknown. In this study, we aimed to investigate the effects of shockwave therapy in non-ischemic heart failure recovery.

MATERIAL & METHOD (PLEASE INCLUDE THE KIND OF DEVICE YOU ARE USING)

To investigate disseminated interstitial fibrosis with reduced ventricular compliance and function, a unique model of non-ischemic heart failure developed by the Cooke Lab was be used. In brief, neurohumoral manipulations using drinking water supplementation with NaCl and the NO synthase inhibitor L-NAME water for five weeks and angiotensin II infusion for four weeks induces widespread interstitial and perivascular fibrosis, mimicking non-ischemic heart failure in mice. Subsequent to the drug discontinuation, mice underwent either a) treatment with electrohydraulic-generated shockwaves (prototype of the NRG device with the CSP applicator manufactured by Heart Regeneration Technologies GmbH, Innsbruck, Austria) with 300 impulses at 3Hz and an energy flux density of 0.27 mJ/mm2 or b) sham treatment. To investigate heart failure and recovery, all animals underwent echocardiography. At the study endpoint, the amount of perivascular fibrosis and angiogenesis were investigated using flow cytometry and histopathology.

RESULTS

Shockwave treated animals showed a significantly better recovery from non-ischemic heart failure than sham treated animals measured by echocardiography and histopathology. They exhibited a lower isovolumetric relaxation time, less fibrosis and reduced signs of cardiac hypertrophy. In flow cytometry studies, the shockwave treated hearts showed a higher amount of induced endothelial cells. These findings go in line with the induction of mesenchymal to endothelial transition in-vitro upon shockwave therapy, indicating that the underlying mechanism of SWT induced regeneration is an increase in vascular density.

DISCUSSION

In summary, our findings provide clear evidence that mechanical conditioning in the form of shockwave therapy contributes to enhanced recovery from non-ischemic heart failure, a disease with no available curative treatment option. While the effects of shockwave therapy for ischemic heart failure are well established (human clinical trial data are currently under review), the effects on non-ischemic heart failure remained to be elucidated. This study provides the necessary basis to broaden the indication of cardiac shockwave therapy in a clinical setting.

TECHNOLOGY: Focused Shockwave
DEVICE AND COMPANY: Heart Regeneration Technologies
COI: No conflict of interest

EFFECTS OF INDIVIDUAL SHOCK WAVE THERAPY VS CELECOXIB ON HIP PAIN CAUSED BY FEMORAL HEAD NECROSIS.

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INTRODUCTION

BACKGROUND: Celecoxib has been used to treat hip discomfort and functional difficulties associated with osteonecrosis of the femoral head (ONFH), although significant adverse reactions often follow long-term use. Extracorporeal shock wave therapy (ESWT) can delay the progression of ONFH, alleviate the pain and functional limitations it causes, and avoid the adverse effects of celecoxib.
AIM: To investigate the effects of individual ESWT, a treatment alternative to the use of celecoxib, in alleviating pain and dysfunction caused by ONFH.

MATERIAL & METHOD

This was a randomized, controlled, double-blinded, non-inferiority trial. We examined 80 patients for eligibility in this study; 8 patients were excluded based on inclusion and exclusion criteria. A total of 72 subjects with ONFH were randomly assigned to group A (n = 36; celecoxib + alendronate + sham-placebo shock wave) or group B (n = 36; individual focused shock wave [ESWT based on magnetic resonance imaging three-dimensional (MRI-3D) reconstruction] + alendronate). The outcomes were assessed at baseline, at the end of treatment, and at an 8-wk follow-up. The primary outcome measure was treatment efficiency after 2 weeks of intervention using the Harris hip score (HHS) (improvement of 10 points or more from the baseline was deemed sufficient). Secondary outcome measures were post-treatment HHS, visual analog scale (VAS), and Western Ontario and McMaster Universities Osteoarthritis Index (WOMAC) scores.

RESULTS

After treatment, the pain treatment efficiency of group B was greater than that of group A (69% vs 51%; 95%CI: 4.56% to 40.56%), with non-inferiority thresholds of -4.56% and -10%, respectively. Furthermore, the HHS, WOMAC, and VAS scores in group B dramatically improved during the follow-up period as compared to those in group A ($P < 0.001$). After therapy, the VAS and WOMAC in group A were significantly improved from the 2nd to 8thwk ($P < 0.001$), although HHS was only significantly altered at the 2 wk point ($P < 0.001$). On the 1st d and 2ndwk after treatment, HHS and VAS scores were different between groups, with the difference in HHS lasting until week 4. Neither group had severe complications such as skin ulcer infection or lower limb motor sensory disturbance.

DISCUSSION

Individual shock wave therapy (ESWT) based on MRI-3D reconstruction was not inferior tocelecoxib in managing hip pain and restrictions associated with ONFH.

TECHNOLOGY: Focused Shockwave
DEVICE AND COMPANY: HK.SWT-007 Huikan company
COI: No conflict of interest

EFFECTIVENESS OF FOCUSED EXTRACORPOREAL SHOCK-WAVES ON MYOFASCIAL TISSUE IN LOW BACK PAIN

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INTRODUCTION

Non-specific Low Back Pain (nsLBP) has a multifactorial aetiology, although recent studies hypothesized a critical role of the myofascial tissue and related myofascial syndrome. The thoracolumbar fascia (TLF) displays a dense innervation with nociceptive afferents and may undergo long-lasting sensitization processes. It may be a source of pain in patients with low back pain. Due to fascial continuity throughout the body, impairment of the myofascial tissue of the lumbar and surrounding regions can alter the basal tension of the TLF itself, thus stimulating its mechanical nociceptors. These changes could be explained by tissue adhesions induced by previous injury or inflammation and Myofascial trigger point (MTrP) presence. Extracorporeal shock wave therapy (ESWT) has advanced as an alternative treatment for myofascial pain in patients with symptoms recalcitrant to traditional conservative treatment. This study aims to investigate the effectiveness of focused ESWT on myofascial tissue of the trunk, pelvis and lower limbs to reduce disability and pain in a group of patients affected by LBP.

MATERIAL & METHOD

44 patients with a diagnosis of chronic LBP (above 3 months of duration with daily manifestations) were selected according to the inclusion criteria and randomly divided into two groups. The study group received a 4-week program of treatment with focused ESWT on the myofascial trigger point of the lumbar region, gluteal area and lower limbs. The control group received conventional physiotherapy. Visual Analog Scale (VAS), Oswestry Disability Index (ODI) and Quebec Back Pain Disability Scale (QBPDS) were selected as primary outcome measures. The patient's evaluation was assessed at the baseline (before the first treatment), after treatment, and at the 3-month follow-up.

RESULTS

Improvement in ODI and QBPDS scores was observed in both groups starting from post-treatment evaluation and confirmed at the 3-month follow-up. The study group showed a higher improvement in the scores of VAS ($p=0,005$), ODI ($p<0,001$) and Quebec Back Pain Disability Scale ($p=0,001$) compared to the control group at the post-treatment evaluation and the 3-month follow-up ($p=0,005$; 0,005; 0,032).

DISCUSSION

Focused ESWT on myofascial points is an effective therapy to reduce low back pain in the short and medium term. Myofascial tissue is an important component in Chronic LBP and a specific reason for LBP. The study supports the role of myofascial tissue in the etiopathogenesis of nsLBP and it might open a new perspective on pain management and ESWT usage. Further investigation and longer follow-up are needed to confirm long-term results.

TECHNOLOGY: Focused Shockwave
DEVICE AND COMPANY: Wolf
COI: No conflict of interest

EVALUATION OF THE APPLICATION OF RADIAL EXTRACORPOREAL SHOCK WAVE THERAPY IN PATIENTS WITH KNEE OSTEOARTHRITIS

Biljana Kalchovska[1], Marija Gocevska[1], Maja Manoleva[1], Valentina Koevska[1], Biljana Mitrevska[1], Cvetanka Savevska-Gerakaroska[1], Erieta Nikolik-Dimitrova[1], Teodora Jugova[1], Daniela Gecevska[1], Ana Krsteska[1]
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INTRODUCTION

Knee osteoarthritis is a common musculoskeletal disorder that leads to reduced functional ability and negatively impact social connectedness and psychological well-being as well as reducing the quality of life (QoL) of the patients. Radial extracorporeal shockwave therapy (RECTUB) has been proposed as a safe, non-invasive, alternative conservative treatment for osteoarthritis of the knee.

MATERIAL & METHOD

The study represents prospective, monocentric, interventional, non-randomized clinical study of 40 RECTUB treated patients (totalling 5 weekly sessions with 5-minute application of 2000 impulses, 2 Bar intensity, 10 Hz frequency at painful knee points) and kinesitherapy. The patients' progress was monitored on the WOMAC Index, the Numeric scale of pain and Short Form 36 Health Survey (SF-36) Questionnaire. The clinical findings were evaluated before the treatment started; immediately after its completion and 3 and 6 months afterwards.

RESULTS

Statistically significant differences were found of the total WOMAC index and its three subscales at the end of the first, second and third control. The three subscale WOMAC index median was 9, 4, 2, and 2 respectively for subscale 1; 3 and 0 for subscale 2; 34.5, 12.5, 7.5 and 8 at baseline and the three follow-up examinations and subscale 3 respectively, at the beginning and the three follow-up examinations. Regarding the Numeric Scale of Pain scored a mean of 7, 4, 2, and 2, respectively, before treatment and at the three follow-up examinations after treatment. It was found that patients had reduced pain intensity was maintained even for 6 months after the applied physical treatment. Regarding the SF-36 Questionnaire, it was shown that the patients had significantly better values for the quality of life in terms of physical functioning, and their general health rated as good.

DISCUSSION

RECTUB is becoming a treatment option for knee osteoarthritis with insufficient scientific papers published on its effectiveness. In a systematic review and meta-analysis of 14 randomized studies published in Spain, RECTUB was found to contribute to greater reduction of pain and improvement of WOMAC index values in a short time. Regarding the effectiveness of RECTUB treatment in patients with knee osteoarthritis for 6 months, as per Shieh meta-analysis measuring pain intensity according to the VAS scale and the degree of functionality according to the WOMAC index, it was found that pain reduction and improvement of the patients' functionality were maintained up to 6 months after the application of this physical modality.

TECHNOLOGY: Radial Pressure Waves
DEVICE AND COMPANY: BTL 5000 SWT Pobwer - BTL Corporate
COI: No conflict of interest

PRECISION AND FUNCTIONAL APPLICATION OF ULTRASOUND-GUIDED EXTRACORPOREAL SHOCK WAVE THERAPY IN NEUROMUSCULOSKELETAL PATHOLOGIES: A MULTI-CENTER RETROSPECTIVE STUDY

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INTRODUCTION

Extracorporeal Shock Wave Therapy (ESWT) has shown promise in myofascial pain alleviation and short-term relief for musculoskeletal conditions [1,2]. This retrospective multicenter study compares the effectiveness of ESWT under ultrasound (US) guidance with conventional approaches in treating various neuromusculoskeletal pathologies, incorporating precise targeting based on ultrasound findings. Advanced imaging techniques such as USG, CT, or MRI were not used for ESWT guidance [3].
Objective: To investigate the impact of ultrasound guidance on the precision, direction, and depth of ESWT in the treatment of neuromusculoskeletal pathologies.

MATERIAL & METHOD

Patient records from 3 clinics in USA, Ukraine, and Spain were examined, and a total of 50 patients underwent ESWT under US guidance, with an additional 100 records included without guidance. Ultrasound imaging identified tendinopathies, trigger points, fascia abnormalities, pannus, and joint fluid. Specific targeting strategies were employed, such as minimum penetration depth adjustments for lateral epicondylitis, tailoring shockwave direction for optimal outcomes.

RESULTS

Significant improvements (50%) in subjective symptoms were observed, emphasizing the nuanced approach of US-guided ESWT. Precision adjustments were made based on ultrasound findings; for instance, in lateral epicondylitis, radial shockwaves were directed to distal finger extensors and wrist retinaculum for a holistic approach. Conversely, for ECRB involvement, radial shockwaves targeted hypertonicity and densifications in the forearm. In a subgroup analysis, patients were categorized into groups undergoing focused shockwave, radial shockwave, and a combination of both. Superior results were observed in the combined approach, where focus on tendons or nerves and fascia yielded enhanced outcomes. Additionally, radial shockwave therapy was explored for Stecco points of CF's (center of fusions), recognizing the significant force transmission (30-40%, up to 50% in some tendons) through fascia.

DISCUSSION

This study underscores the importance of ultrasound guidance in tailoring ESWT for specific neuromusculoskeletal conditions. Precision adjustments in depth and direction, exemplified in lateral epicondylitis cases, showcase the potential of ultrasound to enhance the functional application of ESWT. While these findings suggest the feasibility of a nuanced approach, prospective studies are warranted for validation and exploration across diverse conditions.

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TECHNOLOGY: Focused Shockwave and Radial Pressure Waves
DEVICE AND COMPANY: Storz Medical
COI: No conflict of interest

IS ESWT ABLE TO CHANGE MORPHOLOGY OF THE TENDON IN PATELLAR TENDINOPATHY? A LONGITUDINAL COHORT STUDY WITH THREE-MONTH FOLLOW-UP

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INTRODUCTION

This pilot longitudinal cohort study aimed to assess the mid-term effects of focused extracorporeal shockwave therapy (ESWT) on the clinical symptoms and tendon structure in patellar tendinopathy. Ultrasound (US) evaluation and an innovative approach for in vivo analysis of intratendinous morphology using validated Spatial Frequency Tissue Analysis (SpaFTA) software were used for morphological assessment. SpaFTA analyses the organization of collagen fibers and their density from the US image.

MATERIAL & METHOD

The study included 20 non-professional athletes, with a mean age of 30 ± 9,3 years, all suffering from unilateral symptomatic patellar tendinopathy lasting at least 3 months. To accomplish the study objectives, ESWT was used as the monotherapy. The intensity varied between 0.14 - 0.18 mJ/mm^2 based on patient tolerance, at a frequency of 5 Hz. A total of 4,000 shocks were applied: 2,000 to the area of greatest pathology and 2,000 dynamically to the quadriceps femoris muscle, using the BTL-6000 FSWT device with a piezoelectric generator and a coupling pad allowing a penetration depth of up to 35 mm. Four sessions were conducted at weekly intervals. Clinically, patient-reported pain using Numeric Rating Scale (NRS), and the VISA-P questionnaire were evaluated. Objectively, the anteroposterior tendon diameter (TD) was measured, and then an analysis of US images was performed using SpaFTA software. Clinical tests were re-examined on the day of the last ESWT session, and all measurements were performed three months after the last ESWT session. The morphology of asymptomatic and untreated tendons of the same participants were also evaluated to obtain reference values and assess potential natural changes. The study was registered at ClinicalTrials.gov.

RESULTS

There was a significant reduction in NRS and increase in VISA-P score in both follow-ups ($p < .01$). In initial examination, morphological evaluation showed increased TD, and reduced organization and density of collagen fibers in symptomatic tendons compared to asymptomatic ones. At three-month follow-up, a significant TD reduction ($p < .05$), an improvement in the organization of collagen fibers ($p < .05$) and in their density ($p > .05$) was observed in symptomatic tendons. No significant changes in morphology of asymptomatic tendons occurred.

DISCUSSION

The results support current findings that ESWT is safe and effective in improving symptoms of patellar tendinopathy. Furthermore, this study also suggests a potential influence of ESWT on morphological parameters. In particular, the improved organization and density of collagen fibers three months after the last session may indicate a remodeling process associated with the biological effects of ESWT.

TECHNOLOGY: Focused Shockwave
DEVICE AND COMPANY: BTL, BTL-6000 FSWT
COI: Conflict of interest

This abstract is financially supported by an educational grant of the Charles University Grant Agency.

ROTATOR CUFF TENDINITIS CALCAREA – FRACTIONAL THERAPY WITH FOCUSED EXTRA-CORPOREAL SHOCK WAVES; A CLINICAL REPORT ON VALIDITY AND RELIABILITY

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INTRODUCTION

Calcium deposits in tendons, tendon insertions and bursae of the rotator cuff characterize tendinosis calcarea with the symptoms of severe restriction of movement up to entrapment of the affected shoulder as well as rest and night pain corresponding to an impingement syndrome.
ESWT requires precisely targeted focusing and standardized dosing to produce an optimal effect and to be valid and reliable.

MATERIAL & METHOD

The ESW were generated with a lithotripter-duolite SDI-Storz Medical Ag, which works on the basis of the electromagnetic principle. The trigger frequencies are variable between 0.5Hz and 4Hz. The amplitude is variable from 0.03mJ/mm^2 to 1.84mJ/mm^2 in the focus (12.5cm) of the ultrasonic wave (frequency of 3.5MHz). One third of the patients treated in the last 5 years suffered from different symptoms of the shoulder. Since 2018, we treated more than 500 patients suffering from tendinosis with fractional ESW, which is continuously optimized.
The Monte Carlo method was used to determine at least a minimum effective dose with a lasting effect. Further settings of the dose and fractionation have already been reported at the ISMST Vienna, Prague and Degau by measuring moderate hyperthermia.

RESULTS

With the exception of a few cases (1-2%), therapy was perceived as pleasant. There is no significant side effect, no harmless bruise marks or temporary redness or worrying swelling. More than 98% of patients showed excellent subjective well-being immediately after the end of therapy,
In 95% of the patients, the motor function of the diseased shoulder was completely restored, and the various tests performed were inconclusive. All patients were able to work after 48 hours.
There was no more rest and night pain. The calcium deposit dissolved completely or partially in 2 days to 3 months. Recurrence occurred in 1% of cases after 3-4 years.

DISCUSSION

In addition to recurrent symptoms, conventional ESWT brought side effects such as persistent dull pain that is difficult to localize, extensive redness up to 10cm in diameter, punctate subcutaneous hematomas to punctual necrotic areas. The pain returned in 2-3 weeks; their intermittent recurrence made it necessary to repeat therapy at intervals of 14-30 days.
A retrograde study conducted by us on treated patients between 2002 and 2016 already shows a scientifically based therapy with fractional application of SW.
The validity and reliability of fractional ESWT in tendinosis is derived from the observations of the last five years.

TECHNOLOGY: Focused Shockwave
DEVICE AND COMPANY: Storz-Medical
COI: No conflict of interest

THE EFFECTIVENESS OF ESWT ON ABDUCTOR INJURY AFTER THE IM NAILING COMPARISON STUDY BETWEEN ESWT GROUP AND NON-ESWT GORUP

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INTRODUCTION

Senile hip fracture is one of the most common sites of the osteoporotic fracture. Hip fracture have a mortality rate of approximately 20% within one year, regardless of surgical treatment, with a mortality rate of about 50% within two years when left untreated. surgical treatment is the only option for the management of hip fracture, and for trochanteric fractures, which are the most prevalent, intramedullary nailing is considered the golden standard surgical treatment. However, when performing intramedullary nailing, there is a risk of damage to the abductors. In elderly patients, early rehabilitation is crucial, and iatrogenic injuries like these can have a significant impact on patient prognosis. ESWT has been used in the musculoskeletal system for several decades. It is employed to promote bone union in non-union and delayed union fractures and is also utilized in the treatment of GTPS in the hip joint. this study aims to utilize ultrasound to confirm the occurrence of iatrogenic injuries associated with these surgeries. Additionally, it is expected that ESWT can lead to faster rehabilitation, improved QOL, and reduced mortality rates compared to the group not receiving this treatment.

MATERIAL & METHOD

This prospective study aims to utilized ultrasound examination to assess muscle damage in adult patients who undergo IM nailing for trochanteric fracture, started from May 1 2023 and ended December 30, 2023. The examinations will be conducted in the lateral position whenever feasible, and in the supine position if lateral positioning is not possible. To enhance the accuracy of muscle tear ultrasound findings, both the affected and unaffected sides will be examined simultaneously.

The experimental group will undergo linear-type ESWT three times: once during the initial outpatient follow-up before discharge (usually two weeks after surgery), once after the first follow-up observation (usually one month after surgery), and once before discharge (usually three months after surgery). The ESWT parameters will be as follows: energy flex density of 0.16mj/mm2, depth of 20mm, and 2000 pulses, pain scores and hip function scores will be evaluated at 3- and 6-months post-surgery.

A total of 30 patients undergoing ESWT will be compared with 30 patients who received only conventional treatment, such as analgesics, without ESWT. Patients who consent to ESWT will be assigned to the experimental group, while those who do not consent or do not undergo the therapy will be assigned to the control group.

RESULTS

Data is collecting, will be presented during the congress.

DISCUSSION

Data is collecting, will be presented during the congress.

TECHNOLOGY: Focused Shockwave
DEVICE AND COMPANY: Wolf Piezo II
COI: No conflict of interest

TRANSCRANIAL PULSE STIMULATION IMPROVES COGNITION AND MOOD IN ALZHEIMER´S DISEASE: RESULTS FROM A CASE-CONTROL STUDY

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INTRODUCTION

Transcranial pulse stimulation (TPS, Neurolith®) uses repeated single, ultra-short, high-pressure shock wave pulses to stimulate the brain. There is increasing evidence that TPS is a safe treatment with short-term beneficial effects on cognitive function in patients with Alzheimer's Disease (AD). However, to the best of our knowledge, there are no published works that have used control groups to determine whether the effect of TPS differs significantly from the natural course of the disease.

MATERIAL & METHOD

A case-control study was conducted. Thirty-two patients diagnosed with mild to moderate AD initially received neuro-navigated TPS intervention for two weeks with three sessions per week. Of these, 12 patients (37.5%) could not be followed up, so the treatment group ultimately consisted of 20 patients. The control group included 20 AD patients from a clinical setting who were retrospectively selected and matched to the treatment group based on demographic and clinical variables. Clinical and neuropsychological exams were performed on all patients before and after treatment with a follow-up period of 6 months.

RESULTS

No serious side effects were found. Repeated measures ANOVA showed statistically significant effects of treatment on subjective and affective measures such as perceived health ($F[1, 19]=9.8$, $p=0.006$), GDS-15 ($F[1, 19] = 8.01$, $p=0.012$), and STAI trait ($F[1, 19]=11.7$, $p=0.003$). More interestingly, the experimental group significantly improved their MMSE score during follow-up compared to controls ($F[2,38]=5.21$, $p=0.028$).

DISCUSSION

Conclusions:
TPS is a safe and effective therapy for mild to moderate AD, which has a positive impact on patients' affective symptoms and quality of life. In addition, our findings show that TPS significantly improves patients' cognition compared to the natural course of the disease. Further research and clinical trials are needed to determine the long-term effects and the potential use of TPS in AD´s earlier stages.

TECHNOLOGY: Focused Shockwave and Radial Pressure Waves
DEVICE AND COMPANY: Neurolith (STORZ MEDICAL AG)
COI: No conflict of interest

RESULTS OF ESWT, ACCORDING TO THE ICF, IN PATIENTS WITH SPASTICITY CAUSED BY STROKE: A SYSTEMATIC REVIEW AND IMPACT STATEMENT.

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INTRODUCTION

Spasticity – also called hyper-resistance - develops in 18-38% of patients after stroke and has a negative impact on the quality of life. Direct costs are higher among patients with hyper-resistance. Extracorporeal Shockwave Therapy (ESWT) is a treatment that involves delivery of shockwaves to muscle tissue. This review aims to: 1) assess effects of ESWT in patients with hyper-resistance after stroke concerning the International Classification of Functioning, Disability and Health domains, 2) value the evidence, 3) investigate effect duration and side-effects, 4) search for optimal ESWT-parameters, 5) recommendations for further research.

MATERIAL & METHOD

Literature search was performed up to February 2024 in the databases: Pubmed, Cochrane, PEDro and Cinahl using a Domain-Determinant-and-outcome-search-string. Selection, based on inclusion and exclusion criteria, and assessment for quality, was done by two authors.

RESULTS

Of the 139 articles found, 14 Randomized-Controlled-Trials and 4 Clinical-Controlled-Trials were included. The mean PEDro-score was 6,4. In total 465 people received ESWT. Significant effects were found on the Modified Ashworth Scale, Modified Tardieu Scale, ankle and wrist range-of-motion, hand grip strength, and walking distance on the six-minute walk test. In addition, significant reduction was found on pain in the visual-analog scale and the need for assistance in daily life activities. Effects lasts for several weeks, minimum side-effects were reported.

DISCUSSION

Limitation of this study is that articles may have been missed by search design and no studies were excluded on basis of quality. Long term effect, optimal parameters and best number of sessions remain unclear. In conclusion: ESWT is an effective treatment to reduce hyper-resistance with positive effects on several International Classification of Functioning, Disability and Health domains.
IMPACT STATEMENT: ESWT increases the treatment arsenal for hyper resistance. In the Netherlands this means that the role of the physiotherapist in hyper resistance is completely revised. This is because ESWT is considered a physiotherapeutic treatment by the Dutch Healthcare Authority. Currently 300 Dutch physiotherapists have been trained as ESWT practitioners for hyper resistance. This saves roughly 10 million euros per year in treatment costs and guarantees national accessibility to effective care.

TECHNOLOGY: Radial Pressure Waves
DEVICE AND COMPANY: Storz MP50
COI: No conflict of interest

APPLICATION OF EXTRACORPOREAL SHOCK WAVE THERAPY FOR PLANTAR FASCIITIS AND HAMSTRINGS MUSCLE INJURY.

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INTRODUCTION

Extracorporeal Shockwave Therapy (ESWT) can be classified into Focused-Shock Wave(F-SW) and Radial-Pressure Wave(R-PW). Initially, our hospital used only F-SW since August 2018, additionally using R-PW since October 2021, we have also been incorporating R-PW for plantar fasciitis and hamstrings muscle injury. Here, we would like to report efficacy of treatment for two diseases.

MATERIAL & METHOD

We conducted a study at our hospital from August 2018 to September 2023, involving 18 patients (10 with plantar fasciitis and 8 with hamstrings muscle injury) who underwent ESWT. The patients were divided into two groups: group F, which underwent F-SW only, and group M, which underwent a combination of F-SW and R-PW. The average age was 34.3±14.3 years for plantar fasciitis and 29.6±18.6 years for hamstrings muscle injury, and the average observation period was 10.2±2.2 months for plantar fasciitis and 9.6±3.6 months for hamstrings muscle injury. The evaluation criteria were based on the Visual Analog Scale (VAS) at the initial consultation and final assessment.

RESULTS

For plantar fasciitis, VAS scores showed a decrease in both groups, In group F, VAS score decreased from 7.2±1.8 at the initial consultation to 2.5±1.4 at the final assessment. In group M, VAS score decreased from 6.6±1.2 to 0.9±0.7. Group M improved more than Group F in terms of VAS scores ($P < 0.05$). For hamstrings muscle injury, VAS scores also showed a decrease in both groups. In group F, VAS score decreased from 6.2±1.3 at the initial consultation to 2.8±1.2 at the final assessment. In group M, VAS score decreased from 6.1±1.1 to 1.5±0.8. Improvement in VAS score was observed to be greater in group M compared to group F. Group M Improved significantly more than Group F in terms of VAS scores($p<0.05$).

DISCUSSION

When combining F-SW with R-PW, it was observed that pain relief was greater compared to F-SW only. The addition of R-PW was believed to contribute to muscle relaxation and improved mobility of the fascia in the affected area.

TECHNOLOGY: Focused Shockwave and Radial Pressure Waves
DEVICE AND COMPANY: Duolith SD1 ultra and Masterpuls MP100
COI: No conflict of interest

FOCUSED EXTRACORPOREAL SHOCK WAVE THERAPY FOR SPONTANEOUS OSTEONECROSIS OF THE KNEE

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INTRODUCTION

In recent years, the pathogenesis of spontaneous osteonecrosis of the knee (SONK) has been pathologically characterized as subchondral insufficiency fracture of the femoral condyle. Stress fractures and osteonecrosis are included in the standard indications by the ISMST Consensus Statement. In this study, we administered Focused Extracorporeal Shock Wave Therapy (FSWT) for SONK and evaluated its therapeutic efficacy.

MATERIAL & METHOD

Five patients diagnosed with SONK between 2020 and 2024 who opted for conservative treatment were included. The mean age was 77.4 years, and all patients were female. According to the X-ray Koshino classification, there were 3 cases of Stage I and 2 cases of Stage II. FSWT was performed using Duolith SD1R(Storz Medical, Switzerland). Treatment was administered with the knee in a flexed position to focus shockwaves vertically onto the lesion. Treatment intervals were once a week, and energy levels were adjusted between 0.1 and 0.25 mJ according to biofeedback. Patient-based assessment utilized the Knee injury and Osteoarthritis Outcome Score (KOOS) and Numeric Rating Scale (NRS). Imaging evaluation utilized MRI coronal STIR image to assess the proportion of signal changes in the medial femoral condyle.

RESULTS

The mean follow-up period was 12.4 months, with an average of 10 treatment sessions. KOOS showed improvements in symptom score from 50.4 to 76.6, pain score from 44.6 to 80.6, and activities of daily living score from 49.6 to 78.6. NRS decreased from an average of 7.8 before treatment to 1.4. MRI demonstrated a decrease in lesion changes from an average of 19.28% before treatment to 9.68%

DISCUSSION

Treatment for SONK considers disease stage and age. Options include conservative treatment like insoles and partial weight-bearing, or surgical procedures like high tibial osteotomy and total knee arthroplasty. Conservative treatment is selected in early stages, and in these cases using Focus, the stage did not progress and the pain score improved. FSWT stimulates bone formation and angiogenesis, offering pain relief and improved ADL. Therefore, FSWT could benefit SONK early stage case contemplating surgery.

TECHNOLOGY: Focused Shockwave
DEVICE AND COMPANY: Duolith SD1 Focused shockwave system
COI: No conflict of interest

COMPARISON OF THREE FOCAL SHOCKWAVE PROTOCOLS FOR THE TREATMENT OF ERECTILE DYSFUNCTION. RANDOMIZED CLINICAL TRIAL.

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INTRODUCTION
Multiple treatment modalities have been used to treat erectile dysfunction (ED), including focal shock waves. This therapy has demonstrated a short-term positive effect in patients who respond or not to PDE-5i, with variability in therapeutic protocols. Our objective was to evaluate the medium-term effectiveness of 3 shock wave protocols for the treatment of ED.

MATERIAL & METHOD (PLEASE INCLUDE THE KIND OF DEVICE YOU ARE USING)
Randomized, multicenter clinical trial. 277 men with non-psychological ED, over 18 years of age, without cancer or surgeries in the pelvic area or any neurological disease that affected their erectile function, were randomized to one of three groups: weekly (6 wave sessions (SO), 1 x wk), monthly (6 SO 1 x month) or reinforcement (6 SO, 1 x week + 5 sessions, 1 x month). The wave parameters were the same in all groups, no patient received medication. The primary outcome was the change in IIEF-EF score at 6 months of follow-up. The change in the IIEF at the end of therapy and at 3 months of follow-up, erection hardness with the EHS, and self-esteem with the SEAR questionnaire were also evaluated.

RESULTS
222 patients completed the study. In the 6-month evaluation, the average change in the IIEF-EF in the monthly schedule was 4.3 (+/-6.7), 1.9 (+/-6.5) in the weekly schedule, and 5.0 (+/-6.1) in the reinforcement schedule (p=0.0086). At the end of therapy and at 3 months the change in the IIEF-EF was 3.2 (+/-5.8) and 2.9 (+/-5.5) in the monthly group, 2.7 (+/-4.5) and 3.0 (+/-5.3) in the weekly one, and 4.2 (+/-6.4) and 4.4 (+/-6.5) in the reinforcement one. No differences were found between the groups in the proportion of patients who increased at least one point in erection hardness, nor in the average in the SEAR questionnaire in the evaluations carried out.

DISCUSSION
Our results indicate that although the three focal wave schemes work for the treatment of erectile dysfunction, making a monthly reinforcement of the initial scheme allows the result to last longer. This clinical trial has a large number of patients that allows us to confirm results from other studies. We did not compare against placebo since it had previously been demonstrated by other authors that this therapy is better than placebo therapy for the management of erectile dysfunction.

TECHNOLOGY: Focused Shockwave
DEVICE AND COMPANY: Storz medical
COI: No conflict of interest

LOW INTENSITY SHOCKWAVE THERAPY FOR ERECTILE DYSFUNCTION: A SHAM-CONTROLLED RANDOMIZED TRIAL CONCOMITANTLY EXAMINING LOWER URINARY TRACT SYMPTOMS

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INTRODUCTION

A sham-controlled, randomized prospective trial in men with erectile dysfunction (ED) was performed using an electrohydraulic shockwave device (Softwave TRT/Urogold 100™ MTS). There is a strong association between ED and benign penile hypertrophy (BPH)/lower urinary tract symptoms (LUTS) in aging men. Both conditions have negative impacts on quality of life. ED and LUTS are hyperadrenergic states in the pelvis resulting in excess smooth muscle tone in the corpora cavernosa and prostate.

MATERIAL & METHOD

Participants were randomized 2:1 to active low intensity shockwave therapy (LiSWT) (4 Hz, 0.12 mJ/mm2) or sham. Arm 1 consisted of 3 treatments of 5000 shocks every 3 weeks. Arm 2 consisted of 5000, 3000, 3000 shocks during weeks 1, 2, 3, respectively, followed by an identical cycle of treatment starting 3 weeks later. Treatments were delivered to the penile shaft and perineum. Assessments included prostate specific antigen (PSA) and urinary flow rate. The International Prostate Symptom Score (IPSS) used to screen for BPH, was administered at baseline and follow up. Data were analysed by 2-way repeated measures ANOVA with Geisser-Greenhouse correction. Pairwise comparisons were performed to baseline using Dunnett's multiple comparison test. Missing data were imputed by "last observation carried forward".

RESULTS

35 participants (22 active, 13 sham) were randomized. Baseline median PSA value was 0.78 ng/mL. PSA levels remained stable throughout the study. Baseline urinary flow rate was 34.9 ± 19.7 ml/sec. For both Sham Treatment Arms, IPSS score did not improve. When Sham treatment participants completed active treatment, Arms 1 and 2 revealed consistent although not statistically significant decreases in IPPS scores. At Assessment 2, after active LiSWT treatment, IPSS scores consistently decreased with reductions of 1.75 and 2.0 points for Arms 1 and 2 respectively. Concerning quality of life scores related to urinary function, a majority of patients experienced a high value at baseline. This either stayed the same or improved at Assessment 1.

DISCUSSION

It is theorized that, in part, LiSWT improves ED by relaxing vascular smooth muscle through induction of an increase in endothelial nitric oxide synthase activity and nitric oxide formation. It is theorized that, in part, LiSWT improves LUTS by relaxing prostate smooth muscle tone, similar to the effects of the PDE5 inhibitor tadalfil, approved for treatment of LUTS. More research is needed on the effects of LiSWT on ED and LUTS.

TECHNOLOGY: Focused Shockwave
DEVICE AND COMPANY: Softwave Urogold 100 by TRT/MTS
COI: Conflict of interest

Advisory board, Speaker TRT

A CHART REVIEW OF PATIENTS WITH HORMONALLY-MEDIATED VESTIBULODYNIA TREATED WITH LOW-INTENSITY SHOCKWAVE THERAPY.

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INTRODUCTION

Low intensity shockwave therapy (LiSWT) is a non-pharmacologic, non-surgical treatment strategy, FDA-cleared in the United States for improved blood flow, pain amelioration, connective tissue activation and wound healing. Provoked vestibulodynia, especially hormonally mediated vestibulodynia, is a common and bothersome form of entrance dyspareunia often linked to hormonal contraception use. This chart review examines treatment outcomes of LiSWT using the Softwave TRT/Urogold 100™MTS in patients with hormonally mediated vestibulodynia (HMV).

MATERIAL & METHOD

Patients diagnosed with HMV who were unable or unwilling to take traditional hormone therapy were offered LiSWT. As is standard in our practice, patients completed the Female Sexual Function Index (FSFI) and Sexual Distress Scale (SDS), underwent vulvoscopy with photography and cotton-tipped swab testing at baseline. Pre-treatment hormonal blood tests included total testosterone and sex hormone binding globulin. Vulvoscopic vulvar/vestibular photographs were scored for Vulvar/Vestibular Tissue Appearance (Vul/VestTA) (0 = normal, 1 = minimal, 2 = moderate, 3 = severe) for the vulva, vestibule and urethral meatus. Cotton-tipped swab testing rated pain at the 1:00, 3:00, 5:00, 6:00, 7:00, 9:00 and 11:00 positions (0 = no pain, 1 = minimal, 2 = moderate, 3 = severe). The LiSWT protocol involved 6 treatment sessions, 2100 shocks each (700 right/left lateral vestibule, 700 posterior vestibule), frequency 3/sec, membrane level 1, with energy varied from 0.07 – 0.11 mJ/mm2, based on patient tolerance. Patients underwent vulvar-vestibular photography and cotton-tipped swab testing during the course of LiSWT. Before the second and subsequent treatments, patients completed the Patient Global Impression of Improvement (PGI-I).

RESULTS

19 patients diagnosed with HMV, mean age 35 years (range 18- 45), had low calculated free testosterone (0.16 ± 0.09 ng/dl) and elevated sex hormone binding globulin (94 ± 59 nmol/L). Mean baseline scores were: FSFI 15.2/36; Sexual Distress Scale 31/52; cotton-tipped swab testing averaged 2.4 (moderate to severe pain); and Vul/VestTA 2.6 (moderate to severe tissue quality). Post-treatment 11/19 (58%) of patients reported a PGI-I of 1-3, indicative of clinically relevant improvement. The mean post-treatment cotton-tipped swab testing score was diminished to 1.9 (mild to moderate pain), and Vul/VestTA to 1.7 (mild to moderate tissue quality); vulvar/vestibular photographs revealed reduced vestibular pallor and erythema. One patient experienced transient worsening of symptoms.

DISCUSSION

This small retrospective LiSWT study shows safety and efficacy in individuals with HMV as an alternative to hormone therapy. Prospective, sham-controlled clinical trials of LiSWT for HMV are needed.

TECHNOLOGY: Focused Shockwave
DEVICE AND COMPANY: Softwave Urogold 100 by TRT/MTS
COI: Conflict of interest

Advisory board - TRT

SINGLE SESSION PROTOCOL FOR LIESWT ED TREATMENT. COULD IT BE APPROPRIATE AND SUFFICIENT?

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INTRODUCTION

The aim of this presentation is to provide an initial information on the possibility of single session LiESWT treatment of ED and whether this approach could be appropriate, resulting in satisfying treatment results.

MATERIAL & METHOD

We have developed a new single session treatment protocol (A.S.I.A. – Accelerated Shockwave Induced Angiogenesis) consisting of 16000 shocks applied in single session by LSTC-ED technique and supported by continuous tadalafil 5 mg daily administration and regular sexual stimulation for 30 days. We compared the results of the treatment of these consecutive patients (Group 1) with the randomly selected patients treated in the past with the same amount of shocks in 4 session (4x4000 shocks) (Group 2) as well as with the group of patients treated with tailored algorithm treatment (4 x 9000 shocks in average) (Group 3).

RESULTS

A total of 39 patients were evaluated. Two month after the treatment the average IEF5 score increase in group 1 by 2,7 point which is exactly the same as in the group 2 .However group 1 patients treatment has been supported by additional methods. On the other hand, initial – entry level IIEF5 score was higher in the Group2 which implies better outcomes. The average IIEF5 score increase in group 3 was 6,8 with the initial average score similar to Group 1 which makes this group by far the most successful.

DISCUSSION

Preliminary data are promising suggesting that single session protocol may be suitable in mild ED patients. We will further explore this treatment approach and discuss possible factors influencing treatment results in all groups. As we need data form more patients and long term results, other similar studies will be necessary.

TECHNOLOGY: Focused Shockwave
DEVICE AND COMPANY: Piezowave2 , R.Wolf
COI: No conflict of interest

EAU-EXPERT MEETING AT UROTEC 24 ON EXTRACORPOREAL SHOCK WAVE THERAPY IN UROLOGY

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INTRODUCTION

While conservative treatment is recommended for stable capitellar osteochondritis dissecans (OCD), the period until return to sports has been reported to require 4.4-12 months of rest therapy, causing psychological stress for young athletes. Extracorporeal shock wave therapy (ESWT) for OCD without joint damage is considered a standard indication by the ISMST, but reports on its efficacy are scarce. We have been treating patients with stable OCD with ESWT and have begun to combine ESWT with cast immobilization in an attempt to achieve an even earlier return to play.

MATERIAL & METHOD

We divided 16 cases (11.7±1.3 years) of stable OCD treated with ESWT at our hospital into two groups: ESWT alone (Group F: 8 elbows) and Casting + ESWT (Group CF: 8 elbows), and compared the period until return to sports and union. The equipment used was the DUOLITH SD-1 by Storz, with an energy flux density of 0.02-0.25 mj/mm2, 3000 shots per session, and irradiation once a week (for Group CF, cast immobilization was performed for approximately 4 weeks, and irradiation was also performed during immobilization by partially opening the cast used for irradiation).

RESULTS

There were no significant differences between the two groups in age, stage of disease, size of lesion, or site before treatment. The period until return to sports was significantly shorter in Group CF (3.6 months) compared to Group F (5.8 months) ($P<0.05$), and the period until the union was significantly shorter in Group CF (4.9 months) compared to Group F (6.8 months) ($P<0.05$).

DISCUSSION

ESWT is considered a useful treatment for promoting the healing of stable OCD compared to past reports of conservative therapy for OCD. Additionally, combining ESWT with cast immobilization, previously considered the first choice, suggests the potential for even earlier return to sports and complete healing.

TECHNOLOGY: Focused Shockwave
DEVICE AND COMPANY: DUOLITH SD-1 by Storz
COI: No conflict of interest

A CASE OF DISTAL INSERTIONAL ADDUCTOR TENDINOPATHY IN YOUNG FOOTBALLER REVEALS A CHONDROBLASTIC OSTEOSARCOMA THROUGH ULTRASOUND FOR GUIDED FOCUSED ESWT.

Marta Andrighetti[1]
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INTRODUCTION

Ultrasonography as guiding tool for the administration of extracorporeal shockwave therapy (ESWT) treating musculoskeletal disorders provides a real-time visualization of the target area, improving precision, safety and treatment personalization. In this case-report, ultrasound examination previous focused ESWT (f-ESWT) in suspected distal insertional adductor tendinopathy led to further investigations, revealing a malignant tumor of the medial femoral condyle in a young footballer.

MATERIAL & METHOD

This case report is written in agreement with the CARE guidelines.

RESULTS

An 18-years old male footballer, with no previous medical history, was prescribed f-ESWT after an orthopedic consultation for medial left knee pain, suspected as distal insertional adductor tendinopathy. The pain, which had gradually worsened in the last month, was described as episodic and self-resolutive, present during football activity (specifically passing the ball with inner foot) but not so intense to prevent training, improving with warm up and worsening after activity. There had been no night pain. Clinical examination was negative for knee mobility impairment, superficial appearance alterations and pain except for slight soreness at palpation of medial femoral condyle. Pretreatment ultrasound examination showed, proximal to the insertion of the medial collateral ligament and next to adductor tubercle, a hypoechoic area (4x1.5x1 cm) with defined margins, uneven structure with marked power doppler up taking and irregularity of surrounding cortical bone; Considering to these findings, f-ESWT was not administered and knee X-Ray (negative for findings) and MRI was requested. The MRI showed a 5 cm length area of heteroplasia in the meta diaphyseal region of left medial femoral condyle. The patient was sent immediately to urgent orthopedic consultation and, after biopsy, was diagnosed with chondroblastic osteosarcoma. Medial knee ultrasound knee MRI stir

DISCUSSION

In this case report, ultrasonography results triggered the diagnostic insights necessary to make the right diagnosis, discovering the malignant nature of the pathology and quickly establishing the right therapeutic process. In addition, the administration of a treatment that would have been absolutely contraindicated and dangerous for the patient was avoided. In agreement with the scientific literature, the real-time visualization provided by ultrasound imaging can improve the assessment of the extent and nature of pathological tissues, with a lower risk of unsuccessful ESWT. A standardized integration of ultrasound guidance into ESWT procedures improves clinical outcomes, enhances patient safety and tailored treatment plans. For all this reasons, as suggested by literature and this case report, ultrasound guided ESWT should not be a possibility but the rule of administration of ESWT procedures.

TECHNOLOGY: Focused Shockwave
DEVICE AND COMPANY: EMS Focused Shockwave
COI: No conflict of interest

ORAL PRESENTATION SESSION 6: ESWT IN SPORTS MEDICINE

A NOVEL ATTEMPT OF CONSERVATIVE THERAPY FOR CAPITELLAR OSTEO-CHONDRITIS DISSECANS USING EXTRA-CORPOREAL SHOCK WAVE THERAPY.

Jens Rassweiler [1]
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On the 27th January 2024, another EAU-expert meeting organized by the EAU-section office took place in Vienna during UroTec 24. This time the EAU-section of Urotechnology (ESUT) together with the EAU-section of Andrology (ESAU) prepared the program focusing on the role of extracorporeal shock wave therapy (ESWT) in Urology. They invited also the German speaking Society of Shock wave therapy (DIGEST), the German Society of Shock Wave Lithotripsy and Therapy (DGSWL), and the International Society of Medical Shock Wave Therapy (ISMT). The meeting was supported by four manufacturers of shock wave devices (Elvation, EMS, MTS, and Storz-Medical). According to the well-established format of the EAU-Expert Meeting only key-opinion leaders of this field were invited together with the representatives of the different companies. Herein, the primary objective was to engage in discussions about various technologies, indications, and application modes of extracorporeal shock waves in urology. The expert meeting aims to serve as an interactive platform for the exchange of ideas, featuring state-of-the-art lectures by key opinion leaders in urology and andrology, as well as experts from other specialties such as orthopedics, surgery, and neurology. Additionally, manufacturers of shock wave devices presented their insights. In the presentation, the main aspects will be highlighted.

ORAL PRESENTATION SESSION 6: ESWT IN SPORTS MEDICINE

ESWT IN HIGH LEVEL ATHLETES

Karsten Knobloch[1]
[1] *SportPraxis Prof. Knobloch, Sports medicine, Hannover, Germany*

Player availability is of utmost importance in team sports. Thus, injury burden in a given team remains a crucial factor for both, a team's success and failure. Injury data from the UEFA Champions league study reveal that patella and Achilles tendinopathy in soccer players lead to on average 18 days of time loss, and knee MCL injury to 25 days and an ACL injury to 210 days. Taken into account that in 2014 the proxy costs of a day off is 20.000€ a significant financial burden is associated with such injuries. Therefore the aim is to heal faster even better. The concept of soft tissue engineering incorporates several columns to enhance healing:

Extracorporeal shockwave therapy
Oscillating magnetic fields (PEMF) and extracorporeal magneto transduction therapy (EMTT)
Low level laser therapy (LLLT) for photobiostimulation
Injection techniques
Vibration therapy (35-50Hz)

ESWT has a solid evidence base in tendon issues as well as in bone problems like stress reactions and stress fractures among athletes. There is evolving evidence that ESWT is beneficial in muscle injuries as well by a plethora of effects involving the stimulation of satellite cells, detonization of muscles, antifibrotic effects as well as modulation of inflammation. Notably, the data on ligament injuries and ESWT are still scarce. Data from Vienna report favourable clinical results among ACL reconstructed patients even if focused ESWT is applied only 4-6 weeks after the ACL surgery.

TECHNOLOGY: Focused Shockwave and Radial Pressure Waves
DEVICE AND COMPANY: Storz Medical **COI:** No conflict of interest

FOCAL EXTRACORPOREAL SHOCKWAVE THERAPY IN TREATING SYMPTOMATIC POST-SURGICAL PATIENTS IN A MIDDLE EASTERN SPORTS MEDICINE HOSPITAL

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INTRODUCTION

Previous studies have shown that extracorporeal shockwave therapy (ESWT) promotes healing of non-union fractures, and stress fractures, anterior cruciate ligament graft, knee arthroplasty and skin graft and rotator cuff tendon repair. However, there are no studies on the efficacy of focal shockwave therapy (fESWT) in patients who were symptomatic after common Orthopaedic surgeries despite receiving physiotherapy. We retrospectively evaluated short term outcome and safety in patients with symptomatic post-surgical conditions treated with fESWT for the past 8 years in our sports hospital.

MATERIAL & METHOD

In preliminary retrospective chart review, all patients with sports injuries previously treated with surgery who had pain and movement restriction despite being treated with physiotherapy treated with fESWT from 24th January 2016 to 24th January 2024 were included. An incremental protocol of energy flux density (EFD) from 0.08 to 0.27 mJ/mm2 at 4-5 Hz was used (until the targeted EFD). Patients were followed-up after every 2-4 weeks, and if they were still symptomatic, fESWT was repeated. The patients' pre and immediate post treatment pain score, 5-point Likert scale and adverse events during each visit and total number of visits were recorded.

RESULTS

At Aspetar hospital, 76 patients (9 female; 53 athletes; mean age and BMI of 33 and 26.2 respectively) with persistent pain and movement restriction after Orthopaedic surgery and rehabilitation received 170 fESWT treatments. The commonest region treated were the ankles, knees, and leg. Most patients had surgery in the joints and ligaments (44, 57.9%), bones (17, 22.4%), and tendons (12, 15.8%). The type of surgery, pain change and patient perceived outcome scores were found in table 1 and 2 respectively. Most patients required only a mean of 2.2 visits (SD=1.5, Median=2; Range: 1-9) and only 3 adverse events reported (1.7%) i.e., dizziness, more pain and swelling.

DISCUSSION

Athletes with persisting pain and movement restriction after common Orthopaedic surgeries can be treated safely with only 2 treatments of fESWT. Relief of these symptoms with fESWT would often enable athletes to progress in their rehabilitation towards return to play. However, larger and longer studies are needed to determine the validity and durability of fESWT.

TECHNOLOGY: Focused Shockwave
DEVICE AND COMPANY: Orthogold 100s, MTS
COI: No conflict of interest

TABLE 1. TYPES OF SURGERY AND THE INITIAL PAIN (VAS1) A POST-TREATMENT PAIN (VAS2) AND PAIN CHANGE (VAS1 - VAS2) AFTER EACH ESWT VISIT

Paired Samples test [a]

TYPE OF SURGERY	VAS1		VAS1		PAIRED DIFFERENCES VAS1 - VAS2			95% CONFIDENCE INTERVAL OF THE DIFFERENCE		DURATION (MONTHS)	NUMBER OF PATIENTS	SIG. (2-TAILED)
	MEAN	STD DEV	MEAN	STD DEV	MEAN	STD DEV	STD ERROR MEAN	LOWER	UPPER			
ACHILLES TENDON DEBRIDEMENT/REPAIR	4.7	2.3	1.8	2.2	2.9	2.0	0.5	1.9	3.8	6.4	18	.000
ACLR	2.9	2.2	.6	1.3	2.3	1.8	0.4	1.5	3.1	5.9	21	.000
ANKLE DEBRIDEMENT	4.7	2.6	2.5	2.5	2.2	1.5	0.4	1.2	3.2	4.9	10	.001
ANKLE LIGAMENT REPAIR	4.3	2.4	1.6	1.6	2.6	1.4	0.5	1.4	3.8	5.3	7	.001
ANLKE ORIF	1.8	1.9	.4	.7	1.4	1.6	0.3	0.7	2.1	4.2	20	.001
CAL CAN EAL SPUR EXCISION	7.0	2.8	4.0	1.4	3.0	1.4	1.0	-9.7	15.7	3.0	1	.205
CARTILAGE REPAIR + SEPTIC ARTHRITIS	3.0	1.4	1.5	.7	1.5	0.7	0.5	-4.9	7.9	3.0	1	.205
ECU REPAIR/TFCC	5.3	.7	3.5	1.1	1.8	1.0	0.4	0.9	2.6	4.8	7	.002
ELBOW ORIF	3.3	2.9	1.0	1.4	2.3	1.7	0.9	-0.5	5.0	2.6	3	.078
FEMUR	6.0	1.4	3.5	2.1	2.5	0.7	0.5	-3.9	8.9	5.0	1	.126
FIBULA ORIF	3.7	1.2	2.0	1.7	1.7	0.6	0.3	0.2	3.1	5.0	2	.038
FINGER ORIF	4.7	.6	3.7	.6	1.0	1.0	0.6	-1.5	3.5	1.7	2	.225
KNEE DEBRIDEMENT	6.0	1.1	2.7	1.0	3.3	0.8	0.3	2.5	4.2	10.0	5	.000
MEDIAN AND ULNAR NERVE RELEASE	6.3	1.0	2.3	1.0	4.0	0.8	0.4	2.7	5.3	9.8	3	.002
MENISCUS SURGERY	4.0	1.7	1.9	1.1	2.1	1.6	0.6	0.7	3.6	3.6	6	.011
MP FLR / PATERLLAR ORIF	6.0	1.6	3.6	1.1	2.4	1.3	0.4	1.4	3.4	5.6	9	.000
PATELLA TENDON DEBRIDEMENT	3.7	.6	3.0	1.0	0.7	0.6	0.3	-0.8	2.1	2.0	2	.184
RC TENDON REPAIR	6.0	2.8	3.5	2.1	2.5	0.7	0.5	-3.9	8.9	5.0	1	.126
TALAR MICROFRACTURE	5.0	3.5	3.0	2.6	2.0	1.0	0.6	-0.5	4.5	3.5	2	.074
TIBIAL IM NAIL / ORIF	4.0	2.8	2.3	2.0	1.7	1.3	0.3	1.1	2.2	6.3	22	.000

a. No statistics are computed for one or more split files

TABLE 1. THE PATIENT PERCEIVED OUTCOME (5-POINT LIKERT SCALE) ACCORDING TO THE TYPE OF SURGERY

SURGERY	MUCH WORSE	LITTLE WORSE	NO CHANGE	LITTLE BETTER	MUCH BETTE	TOTAL
TIBIAL IM NAIL/ORIF	0.0%	0.0%	28.0%	24.0%	48.0%	25
ANLKE ORIF	0.0%	0.0%	39.1%	0.0%	60.9%	23
ACLR	0.0%	0.0%	4.5%	13.6%	81.8%	22
ACHILLES TENDON DEBRIDEMENT/REPAIR	0.0%	0.0%	5.3%	10.5%	84.2%	19
ANLKE DEBRIDEMENT	0.0%	0.0%	18.2%	18.%	63.6%	11
MPFLR / PATERLLAR ORIF	0.0%	0.0%	10.0%	40.0%	50.0%	10
ANKLE LIGAMENT REPAIR	0.0%	0.0%	0.0%	12.5%	87.5%	8
ECU REPAIR/TFCC	0.0%	0.0%	12.5%	50.0%	37.5%	8
MENISCUS SURGERY	0.0%	28.6%	0.0%	14.3%	57.1%	7
KNEE DEBRIDEMENT	0.0%	0.0%	0.0%	16.7%	83.3%	6
ELBOW ORIF	0.0%	0.0%	0.0%	0.0%	100.0%	4
MEDIAN AND ULNAR NERVE RELEASE	0.0%	0.0%	0.0%	0.0%	100.0%	43
FIBULA ORIF	0.0%	0.0%	0.0%	33.3%	66.7%	3
FINGER ORIF	0.0%	0.0%	33.3%	33.3%	33.3%	3
PATELLA TENDON DEBRIDEMENT	0.0%	0.0%	0.0%	66.7%	33.3%	3
TALAR MICROFRACTURE	0.0%	0.0%	0.0%	0.0%	100.0%	3
5TH MT ORIF	0.0%	0.0%	100.0%	0.0%	0.0%	2
CALCANUAL SPUR EXCISION	0.0%	0.0%	0.0%	0.0%	100.0%	2
CARTILAGE REPAIR + SEPTIC ARTHRITIS	0.0%	0.0%	0.0%	0.0%	100.0%	2
FEMU ORIF	0.0%	0.0%	0.0%	100.0%	0.0%	2
RC TENDON REPAIR	0.0%	0.0%	0.0%	100.0%	0.0%	2
ACROMION DECOMPRESSION	0.0%	0.0%	0.0%	0.0%	100.0%	1

COMBINED THERAPY OF PLATELET-RICH PLASMA AND EXTRACORPOREAL SHOCK WAVE TREATMENT FOR FRACTURES

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INTRODUCTION

The impact of combining Platelet-Rich Plasma (PRP) and Extracorporeal Shock Wave Therapy (ESWT) on fracture healing remains unclear. This study aimed to investigate the clinical outcomes of cases treated with the combined therapy.

MATERIAL & METHOD

The study included 22 cases where both PRP and ESWT were administered for fractures. The average age was 21 years (12-52), all of whom aimed to return to sports activities. There were 11 cases of traumatic fractures and 11 cases of stress fracture. The average period from the onset of the fracture to the initiation of this treatment was 137 days (0-1530), and the average duration from the start of this treatment to the final observation was 86 days (12-266).
4ml of leukocyte-poor PRP was prepared from the patient's blood and injected into the fracture site under ultrasound guidance. Subsequently, ESWT was applied to the fracture site. Using the Duolith SD1 (Storz Medical), a total of 2500 pulses at an energy level of 0.25mJ/mm2 were administered. Treatments were conducted every 2 to 4 weeks until fracture healing was observed or the treatment was deemed ineffective. Evaluation criteria included whether the fracture healed, the feasibility of returning to sports, and the duration from the start of treatment to healing. The assessment of fracture healing was based on radiograph.

RESULTS

Out of the 22 cases, 13 achieved healing, while 9 did not. All 13 cases with fracture healing were able to return to sports activities. The average duration from the onset of symptoms to the start of treatment was 48 days (0-247). The average time from the start of treatment to the confirmation of bone healing was 38 days (16-134). Among these 13 cases, there were 7 instances of traumatic fractures and 6 of stress fractures. Of the 9 cases that did not achieve bone healing, 3 were able to return to sports regardless. The remaining 6 cases, which could not return to sports, all underwent surgical bone grafting for non-union. The average period from the onset to the start of treatment for these cases was 265 days (1-1530).

DISCUSSION

While there were instances where bone healing was rapidly achieved following the start of treatment, there were also cases that did not achieve bone healing and required surgical intervention. The combined use of PRP and ESWT has been shown to be effective in promoting fracture healing; however, this suggests there are limitations to its efficacy.

TECHNOLOGY: Focused Shockwave
DEVICE AND COMPANY: Duolith SD1 (Storz Medical)
COI: No conflict of interest

ESWT FOR SKIN REJUVENATION AND CELLULITE

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ESWT has a plethora of biological effects not only limited to tendons, bones and muscles, but also to the skin and the lymphatic tissue. In a meta-analysis including a total of twelve clinical trials on the effects of ESWT on cellulite with a total of 322included females. Both, focused as well as radial ESWT devices have been found effective in treating cellulite so far with follow-up assessment among 3 to 12 months following ESWT. Typically, one or two sessions per week and six to eight sessions overall were studied in the published clinical trials. The combination of radial and focused ESWT was done in three clinical trials. Overall, outcome parameters mainly focused ondigital standardized photographs, circumference measurements and specific ultrasound examinations. Reporting quality showed substantial heterogenity from 22 to82 points with a mean of 57 points. In spasticity, a systematic review involving 1086 patients from 31 randomized-controlled trials or cohort studies found favourable results for both, focused ESWT and radial pressure wave devices. In electromagnetic focused ESWT 8 RCTs (n=323 patients) and 3cohort studies (n=44) used either very low-energetic (0.03-0.05mJ/mm2) with 1500-2000shots and 4-5Hz with 3-5 focused sessions, or low-energetic 0.07-0.12mJ/mm2 with1500-2000 shots with 4-5Hz & 1-3 sessions. Energy-wise three radial studies were very low-energetic 0.6 to 1bar and 14 studies applied low-energetic radial pressures 1.5-3bar.Notably, the frequency was mainly 4-8Hz in the radial studies. Both, radial and focused very low- to low-energetic ESWT improve function and reduce spasticity significantly. Thus the application of ESWT for facial rejuvenation aims to reduce the enhances muscle tone especially in wrinkles of the upper half of the face, which usually respond quite well to botulinum toxin A injections. Experimental data support that a one week interval is superior to a 2 or 3 week interval in terms of collagen induction in the subdermal layer. ESWT appears in addition as a congenial partner for other rejuvenation techniques like medical needling, laser therapy and others. ESWT can enhance lymphatic outflow both, in the face as well as on the body which further underpins its role in the aesthetic field. Therefore even the combination of surgical approaches can reduce complications and foster tissue healing to a higher level.

TECHNOLOGY: Focused Shockwave and Radial Pressure Waves
DEVICE AND COMPANY: Storz Medical
COI: No conflict of interest

ACOUSTIC SHOCKWAVE THERAPY IN RECURRENT METASTATIC BREAST CANCER

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INTRODUCTION

Acoustic shockwave therapy is a known and accepted therapy for reduction of pain in many musculoskeletal clinical settings. One of the contraindications of use is the presence of neoplastic disease within the treatment area. This case report is of a patient who was treated in a non-medical facility for pain relief and disability associated with recurrent metastatic infiltrating ductal carcinoma. In this country application of ESWT is permitted in non-medical facilities. The patient responded very positively from three sessions of shockwave therapy over a 6-week time period with total pain relief and return to normal activity. Concomitantly, medical oncologic therapy was being administered and diagnostic imaging was being done in the form of checkpoint inhibitor class of chemotherapy and sequential PET scans. The clinical course is discussed.

MATERIAL & METHOD

Retrospective analysis of the patient's presentation, previous and ongoing therapy and outcome thus far is presented.

RESULTS

Pain relief was prompt and long lasting. Wheelchair and walker assistance was no longer needed. PET scan results showed dramatic resolution of metastatic foci over a 4-month period. Additional therapeutic benefits were realized with ESWT in managing chemotherapeutic related neuropathy.

DISCUSSION

Metastatic breast cancer, like many other neoplastic diseases has been shown to respond in many cases to the checkpoint inhibitor class of chemotherapeutic agents.
Shockwave therapy is an acceptable therapy for pain relief in multiple clinical settings. Presence of cancer is considered a contraindication for the use of shockwave therapy.
This case study demonstrates a non-medical application of ESWT directly onto an unrecognized metastatic lesion in the lower spine. Relief of pain was immediate and the goal of the chemotherapy was not compromised. This apparent lack of negative effect brings to question the theoretical contraindication label for ESWT in the presence of cancer. In fact, it may be hypothesized that a synergistic effect may be realized as has been demonstrated in other research. The concept of ESWT as a contraindication in cancer therapy needs to be examined and proper scientific study pursued in order to answer this question.

TECHNOLOGY: Focused Shockwave
DEVICE AND COMPANY: OrthGold Acoustic Shockwave Device, SoftwaveTRT
COI: Conflict of interest

Shareholder in Softwave TRT,LLC
Medical Advisor Softwave TRT

RESULTS OF ESWT, ACCORDING TO THE ICF, IN PATIENTS WITH KNEE OSTEOARTHRITIS: A SYSTEMATIC REVIEW

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INTRODUCTION

Osteoarthritis is the most common musculoskeletal disorder in the Netherlands, with the knee and hip as the most common locations. The prevalence in the Netherlands was 727,000 patients in 2021. The associated healthcare costs amounted to 1.1 billion per year. Studies have recently been published showing that Extracorporeal Shockwave Therapy reduces the symptoms of gonarthrosis. However, there is currently no overview regarding the effects of ESWT in accordance with outcome measures of the International Classification of Functioning, Disability and Health. In this study we would like to answer the following question: What are the results of ESWT, according to the ICF, in patients with knee osteoarthritis?

MATERIAL & METHOD

Literature search was performed up to February 2024 in the databases: Pubmed, Cochrane, PEDro and Cinahl using a Domain-Determinant-and-outcome-search-string. Selection, based on inclusion and exclusion criteria, and assessment for quality, was done by two authors.

RESULTS

Of the 154 articles found, 14 Randomized-Controlled-Trials were included. The mean PEDro-score was 6,7. Significant effects were found on the VAS, WOMAC, ROM, 6MWT, TUG and Lequesne Index.

DISCUSSION

Although radial pressure wave and focused shockwave therapy are both effective, focused shockwave therapy provides better results in terms of pain, functionality and walking distance. The physiological effect has not yet been fully mapped out, although the effect on the subchondral bone provides a plausible explanation for the improvements found. ESWT appears to be a promising treatment method for knee osteoarthritis.

TECHNOLOGY: Focused Shockwave
DEVICE AND COMPANY: Storz Medical Duolith
COI: No conflict of interest

A NOVEL USE OF SHOCKWAVE THERAPY FOR DRIVELINE COMPLICATIONS IN LVAD AND OTHER MCS PATIENTS

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INTRODUCTION

Mechanical Circulatory Support has emerged as an integral treatment or management therapy for those patients with appropriate indications. One of the most challenging conditions is the long-term complications of the driveline power supply cord and its course and exit through the tissues. Due to the severity of the consequences, a driveline infection can become a major complication with limited management options.

MATERIAL & METHOD

A retrospective analysis of 12 patients who received FDA approved externally applied acoustic shockwave therapy to symptomatic wounds. Standard of care with regard to wound care was the "control" group of patients that did not receive the shockwave therapy.A retrospective analysis of 12 patients who received FDA approved externally applied acoustic shockwave therapy to symptomatic wounds. Standard of care with regard to wound care was the "control" group of patients that did not receive the shockwave therapy. Three broad categories were selected for data to be gathered and reported.

1. Pain relief was the initial target. The first indication of problems with a driveline is often heralded by discomfort.
2. Antimicrobial effects. Acoustic shockwave influence on bacterial infection has been reported in a substantial number of publications.
3. Regenerative effects. Perhaps one of the more promising research avenues has been the expanding data on the physiological response on a cellular level to the mechanical stimulus of shockwaves.
4. Safety of the applied shockwave energy as to any untoward effects on the treated patients or their hardware devices.

RESULTS

No negative effects were experienced in the treated patients. Pain relief was often immediate and lasting to various degrees as to time and efficacy. Retrograde propagation of bacterial colonization from the exit site was reduced or at least prolonged in the treated group vs standard of care.

DISCUSSION

Acoustic shockwave therapy in this clinical setting has the potential to safely affect the clinical course of MCS patients.

Driveline infections are a serious complication of Mechanical Circulatory Support (MCS)devices. This study evaluated the effects of externally applied acoustic shockwave therapy (ESWT) on 12patients with symptomatic driveline wounds, compared to standard wound care. The outcomes measured were pain relief, antimicrobial activity, tissue regeneration, and safety. The results showed that ESWT was well-tolerated and effective in reducing pain and bacterial colonization, as well as stimulating cellular responses to promote healing. ESWT may be a promising adjunct therapy for MCS patients with driveline infections.

TECHNOLOGY: Focused Shockwave
DEVICE AND COMPANY: SoftwaveTRT
COI: Conflict of interest

Shares of TRT stock
Medical Consultant for SoftwaveTRT

ESWT: IT'S TIME TO PUT THE GENDER ON THE AGENDAW

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INTRODUCTION

Extracorporeal shock wave therapy (ESWT) is widely applied for the treatment of musculoskeletal diseases, skeletal pathologies, in particular the locomotory systems and of note, in wound healing. Most recently, ESWT was also implemented in other medical fields such as for the therapy of coronary artery disease and muscle, urological and andrological disorders including Peyronie's disease and erectile dysfunction. The application of ESWT is steadily increasing in these fields. In consequence, beside from the cosmetic application the patient clientele for ESWT is somewhat male dominated. This raises the question, whether there is a medical scope of application in the medical discipline of gynecology and reproductive medicine.

MATERIAL & METHOD

A literature review was undertaken using PubMed, Elsevier and Google Scholar using the different combinations of the following keywords: "ESWT" and "gynecology", "IVF", "uterus", "Asherman" "endometrium", "endometriosis", "Implantation failure". In addition, we reviewed the different molecular mechanisms of different mechanisms of cellular response due to ESWT.

RESULTS

The search results reveal that ESWT is almost not applied in gynecology and complementary to assisted reproduction with the exception of a pilot study for the treatment of endometriosis: From rodent Asherman model systems an attenuation of uterine fibrosis and inflammatory markers by the application of platelet-rich plasma (PRP) combined with ESWT. We postulate that of note the human endometrium which represents a highly dynamic tissue with a huge capacity of regeneration might represent a interesting field of application for ESWT. It has been estimated that infertility is related to endometrial factors in 5-10% but might be even underappreciated. We hypothesize that ESWT might have beneficial effects in endometrial disorders by (i) increasing the proliferation, (ii) increasing the stem cell niche, (iii) improving angiogenesis and neovascularization and by (iiii) altering the epithelial-mesenchymal transition.

DISCUSSION

The female body is unique in regard to subjected to hormonal effects during menarche, aging and pregnancy-related conversion of the body. For these very reasons, the female body is also prone to suffer from a large number of gynecological, reproductive and post-obstetric diseases –including not only endometrial disorders but childbirth-related injuries such as perineal tear. Although not all might represent a field of application for ESWT, we recommend that more basic research for ESWT is needed within the scope of gynecology, obstetrics and reproductive medicine.

TECHNOLOGY: Focused Shockwave and Radial Pressure Waves
DEVICE AND COMPANY: Device and Company Duolith (Storz medical)
COI: No conflict of interest

TESTING, TEACHING, TREATING - A NEW APPROACH TOWARDS BETTER ESWT APPLICATION

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INTRODUCTION

Proper application of ESWT is critical to therapeutic success and the avoidance of adverse effects. Two key factors to consider are the applicator specific focal field geometry and its intensity which both, by their nature, are invisible to the therapist. As such, training and educational efforts need to effectively promote an understanding of the physical principles of shockwaves to fully convey the methodology of ESWT in all aspects thus achieving optimal treatment outcomes.

MATERIAL & METHOD

In-situ sound field measurements during in vivo application of ESWT and anatomical assessment of tissue damage in pre-clinical animal models allow for an unbiased evaluation of therapy applications and adverse effects. Implantation of hydrophones in test setups further allows for dosing assessments as a function of applicator settings and handling. Computational simulations can further evaluate the shockwave energies, focused sound field geometries, and application patterns for different applicators and shockwave generation technologies, drawing a comprehensive picture of the therapeutic approach.

RESULTS

Our evidence shows shockwave-induced damage on lung tissue at energy levels commonly used in the clinical field in a relevant, large animal model, emphasizing the importance of clarity and forcefulness of contraindication guidelines. We further demonstrate dose dependency of both these adverse, as well as beneficial cell and tissue effects laying out the rationale behind a proper and precise ESWT application. This challenge is further documented by live in situ measurements during in vivo ESWT treatments of animals indicating a significant therapist effect, underlining the importance of qualification and training. Finally, we propose a novel didactic approach of training and teaching to assure an effective state of the art knowledge transfer in the field of ESWT. Utilizing cutting edge, emerging technologies that are specifically adapted to ESWT, it has the potential to provide top of the line training and education for ESWT therapists in the years to come.

DISCUSSION

There are strong indications and a clear rationale that treatment outcomes are based on proper application patterns and are thus manageable by optimal training and education. Consequently, establishing a robust didactic framework to address these challenges in the field of biophysical therapies is key in advancing ESWT.

TECHNOLOGY: Focused Shockwave
DEVICE AND COMPANY: MTS
COI: Conflict of interest

Paul Slezak and Cyrill Slezak are co-founders of WaveVision, a company offering simulations and visualizations of biophysical therapies.

POSTER PRESENTATION

CONSERVATIVE TREATMENT WITH AND WITHOUT FOCUSED SHOCK WAVE THERAPY FOR OSTEOCHONDRITIS DISSECANS OF THE HUMERAL CAPITELLUM IN BASEBALL PLAYERS

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INTRODUCTION
We retrospectively investigated the outcomes of conservative treatment for osteochondritis dissecans of the humeral capitellum (OCD) in baseball players and compared them with and without focused shock wave therapy (FSW).

MATERIAL & METHOD
We retrospectively investigated the outcomes of conservative treatment for osteochondritis dissecans of the humeral capitellum (OCD) in baseball players and compared them with and without focused shock wave therapy (FSW). Methods: OCD up to the separation stage before closure of the epiphyseal line, which is an indication for conservative treatment, was divided into two groups: 16 elbows in the FSW use group (F group) and 25 elbows in the non-use group (C group). All patients were male baseball players. The mean age at first visit was 11.8 years in group F and 12.1 years in group C. The lesion classification (extensive, central, or lateral type) was 10, 5, and 1 elbow in group F and 16, 8, and 1 elbow in group C. The staging (translucent stage, early separation, and late separation) was 7, 8, and 1 in group F and 12, 12, and 1 in group C. Conservative therapy consisted of suspension of pitching and hitting, and FSW irradiation to the OCD lesion at 2-4 week intervals in Group F. In principle, resumption of pitching was permitted after sufficient reconstruction of the lateral wall on plain radiographs was confirmed, with conditioning and pitching motion instruction.

RESULTS
The repair status (complete, adequate, insufficient, unchanged, or worsened) was 9, 3, 3, 3, 1, and 0 elbows in Group F and 9, 5, 7, 3, and 1 elbow in Group C. The number of operated cases was 4 (25%) in Group F and 9 (36%) in Group C, with no significant differences between the two groups. There were no adverse events due to FSW.

DISCUSSION
FSW may accelerate the healing of OCD and accelerate the timing of resumption of pitching and return to competition.

TECHNOLOGY: Focused Shockwave
DEVICE AND COMPANY: Stortz
COI: No conflict of interest

POSTER PRESENTATION

EXTRACORPOREAL MAGNETOTRANSDUCTION THERAPY (EMTT) - SHOCKWAVE THERAPY (ESWT) FOR THIGH PAIN

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INTRODUCTION

An 18-year-old male former elite wrestler with no medical history presented one month after a hard impact to his left thigh while playing wiffle ball. Within 24 hours he subsequently developed an urticarial-like rash, swelling, throbbing pain worst at night and early morning, associated with leg weakness and limited range of motion. He used conservative measures such as rest, ice, OTC anti-inflammatories for one month with minimal pain relief. Three weeks later he presented to the office for further evaluation due to 7/10 pain and continued limited range of motion.

Extremities: Pulses intact, Left lower extremities Inspection: Ecchymoses on L anterior thigh, Limping Gait L thigh circumference: 53cm at 20cm proximal patellar pole; 55cm at 25cm R thigh circumference: 53cm at 20cm proximal patellar pole; 54cm at 25cm Palpation: Tender on vastus lateralis and intermedius ROM: L knee flexion: 125 degrees. R knee flexion: 150 degrees. Sensation: Intact Strength: 3/5 quadricep flexion Left.

MATERIAL & METHOD

XR L Femur: Ill-defined calcification is noted about the mid to proximal left femoral shaft. No obvious periosteal reaction. No acute fracture or dislocation. US LT thigh: Large 9x1.2 cm hematoma mid third vastus intermedius appearing chronic septate x 3. Partial muscle tearing. 3 large heterotopic ossifications in region. Hyperechoic densities measure 1.4cm, 1.84cm, 1.98cm with small punctate calcifications. No suspicious pattern noted. Negative doppler.

RESULTS

Significant improvement noted after hematoma drainage x2 via ultrasound guidance (total 59cc) and after four sessions of EMTT and ESWT were completed. He reported significant improvement in pain (0/10), strength (5/5), and range of motion (L knee flexion 145 degrees and L thigh circumference: 53cm at 20cm proximal to proximal patellar pole; 54cm at 25cm) Patient able to return to activity within 2 months of initial injury. Plan to follow up closely with repeat US, x-rays and as needed physical therapy.

DISCUSSION

Myositis ossificans is characterized by heterotopic bone formation within muscle tissue, due to trauma/injury. It occurs often in contact sports and in 9 -14 % muscle contusions. US findings precede radiographic findings and are difficult to differentiate from sarcoma. Treatment options are primarily conservative, focusing on symptom management and rehabilitation. In mild cases, athletes resume activities 3-6 months. Severe cases or those requiring surgical intervention have extended recovery up to a year, which is a long return to play. EMTT and ESWT have been used in MO to speed return to play by reducing pain and promoting healing.

TECHNOLOGY: Focused Shockwave and Radial Pressure Waves
DEVICE AND COMPANY: Masterpuls Storz Medical
COI: No conflict of interest

POSTER PRESENTATION

ASSESSMENT BY GRAYSCALE AND COLOR DOPPLER ULTRA-SOUND AFTER LOW INTENSITY SHOCKWAVE TREATMENT OF THE ERECT PENIS USING AN AIR REFLECTOR

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INTRODUCTION

Multiple studies have shown that low intensity shockwave therapy (LiSWT) to the penis is safe and efficacious for the treatment of erectile dysfunction (ED). Erectile function improvement occurs via the effects of LiSWT-induced mechanotransduction on erectile tissue. Mechanotransduction, in part, increases the density of mesenchymal stem cells, the precursors to downstream cells such as corpora cavernosal smooth muscle cells. It is hypothesized that maximizing shockwave energy absorption in the erectile tissue results in increased mechanotransduction effects in erectile tissue. In this study, to maximize energy absorption in erectile tissue and thereby maximally improve erectile tissue health and function, LiSWT was performed during sustained pharmacologic erection using an air reflector.

MATERIAL & METHOD

A retrospective chart review of penile grayscale/color Doppler ultrasound (G/DUS) parameters, pre and post LiSWT (Softwave TRT/Urogold 100 MTS) in men with ED was performed. In the erect state, baseline multiple axial grayscale images were taken at the proximal, midshaft, distal shaft and right/left crural regions of the penis. In the erect shaft, right/left sagittal planes, baseline cavernosal artery peak systolic velocity (PSV) and end diastolic velocity (EDV) values were obtained. ED patients subsequently underwent 5 erect penile LiSWT treatments over varying intervals. After sustained pharmacologic erection, 800 shocks (energy flux density 0.13mJ/mm2, 3 Hz, membrane pressure 3), were applied each to the dorsal and ventral shaft using an air reflector placed against the opposite side of the shaft. 800 shocks were then applied to the right/left crura. Patient Global Impression of Improvement (PGI-I) was scored at each repeat visit. Approximately 2-3 months after the last treatment, penile G/DUS was repeated. Baseline and post-treatment grayscale images were analyzed by Image J, a computer-based imaging tool, to assess erectile tissue inhomogeneity, recording percent hypo-echoic area. PGI-I scores were correlated to ultrasound findings.

RESULTS

29 patients (mean age 47 ± 23) met inclusion criteria. 18/29 (62%) had improved erectile tissue homogeneity post-LiSWT, 7/29 (24%) were unchanged, 4/29 (14%) worsened. 15/29 (52%) had PSV increase and 21/29 (73%) had EDV decrease, both markers of better quality erectile function. Of patients with improved G/DUS findings, 20/29 (69%) rated PGI-I as improved.
Discussion
Maximizing erectile tissue energy absorption and therefore LiSWT-induced mechanotransduction in men with ED involves performing LiSWT during a sustained pharmacologic penile erection with an air reflector. Maximizing mechanotransduction may reduce the number of LiWST needed.

TECHNOLOGY: Focused Shockwave
DEVICE AND COMPANY: Softwave Urogold 100 by TRT/MTS
COI: Conflict of interest
Please, specify your conflict of interest:
Advisory board, Speaker TRT

POSTER PRESENTATION

EXTENSIVE BURNS TREATED WITH EXTRACORPOREAL SHOCK WAVES THERAPY: A CLINICAL CASE

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INTRODUCTION

The application of ESWT in burns is a new and promising therapy. The main objective of our clinical case is to show the safety of our protocol designed for pressure ulcers.

MATERIAL & METHOD

54 year old male who suffered burns in 75% of his total body surface area (TBSA) (45% graded as full-thickness and 30% as partial-thickness).
He went to surgery several times, nevertheless he had non-epithelialized burned areas such as: groins, legs and sacrum and a donor area, five months after the accident.

Research in literature: PUBMED database: (("extracorporeal shockwave therapy"[MeSH Terms] OR ("extracorporeal"[All Fields] AND "shockwave"[All Fields] AND "therapy"[All Fields]) OR "extracorporeal shockwave therapy"[All Fields] OR ("shock"[All Fields] AND "wave"[All Fields] AND "therapy"[All Fields]) OR "shock wave therapy"[All Fields]) AND ("burns"[MeSH Terms] OR "burns"[All Fields] OR "burn"[All Fields])), no restrictions for years, language nor type of study.

Our protocol for ESW in wounds:

- type of device: non focalized ESW , piezoelectric mechanism of action
- parameters: energy 0,08mJ/mm, number of impulses = area x 10 + 360, one session per week.
- application: saline solution for washing the wound, sterilized ultrasound gel in the wound surface and sterilized prove cover for the device.
- analgesia: - gabapentin 300mg + acetaminophen intravenous 30 minutes before the therapy. - fast absorption fentanyl during the procedure.
- 4 to 6 hours after application oral acetaminophen was offered.

RESULTS

Research in literature: 55 articles which abstracts were revised and full texts from the selected publications. 16 articles selected: 4 related with the effect of esWT in vitro, 3 in animal models, 1 clinical case, 1 systematic review, 6 clinical essays and 1 meta-analysis.
We conclude that ESWT appears to improve general medical condition and tissue perfusion as well as reduce pain, inflammation and scar hypertrophy. All of this in a simple way, accessible with minimal discomfort and safety. After 10 sessions all wounds were epithelized.

DISCUSSION

In our experience the use of ESW as a therapy associated with cures seems to have acted favourably in the resolution of extensive burns in regions susceptible to maceration and support during sitting and decubitus. No complications were recorded except for a burning/discomfort sensation 4-6 hours after application, which disappeared with conventional analgesia.
However, the available scientific evidence is still weak due to the scarcity of published studies and more studies are necessary to generate solid therapeutic recommendations.

TECHNOLOGY: Focused Shockwave
DEVICE AND COMPANY: Piezowave
COI: No conflict of interest

POSTER PRESENTATION

EFFECTS OF EXTRACORPOREAL SHOCK WAVE THERAPY IN AN UNUSUAL CASE OF LEDDERHOSE DISEASE

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INTRODUCTION

Ledderhose disease (LD) is a rare benign, hyperproliferative condition affecting the plantar aponeurosis of the foot, characterized by the formation of one or more subcutaneous nodules. Progressively, the nodules enlarge and become markedly tender, erythematous, painful, and evolve into lesions that negatively affect patient's quality of life. At present, LD is treated either with conservative approaches or with surgical management especially for severe cases refractory to conservative treatments. However, several reports indicate that these surgical interventions have a high nodular recurrence rate and multiple wound complications. In this scenario, extracorporeal shock wave therapy (ESWT) has emerged as a safe, effective, and less invasive approach for the successful treatment of several fibroproliferative conditions. On the contrary, despite the similar pattern of disease, literature regarding the use of ESWT for LD is extremely limited, with different degrees of success. In this work we discuss a case of a male patient with an unusual bilateral LD treated with a modified treatment protocol of focused ESWT.

MATERIAL & METHOD

A 48-year-old man presenting with a painful protruding nodule on the medial plantar aspect of the left foot underwent ESWT once a week for 3-weeks. Unexpectedly, patients presented two small palpable subcutaneous asymptomatic nodules on the right foot. The novel focused ESWT protocol of treatment consisted of 3 sessions at 1-week intervals, with 2000 impulses at 5 Hz with an energy flux density of 0.20 mJ/mm2 (DUOLITH® SD1 ultra, Storz Medical). Ultrasound (US) evaluation was performed to confirm the diagnosis and to measure nodules' size modifications after treatment. The patient was administered various self-valuating questionnaires to assess foot pain and function. Data were collected at baseline (T0), at 1 week (T1), and two months (T2) after the last ESWT.

RESULTS

The patient experienced a marked decrease in pain intensity level and improvement in functioning at T1 and T2 follow-up visits. Despite we did not observe any changes in nodule's measurement by US evaluation, after ESWT, the nodules became darker and showed a more uniform pattern on US from T0 to T2. These modifications were accompanied by a substantial improvement in softening of nodule consistency.

DISCUSSION

This case report adds to previous limited literature and discusses the potential molecular mechanisms that underly the beneficial effects of ESWT for the treatment of LD. Our case report confirms the efficacy of focused ESWT in reducing pain, disability and improving activity limitation in LD patients.

TECHNOLOGY: Focused Shockwave
DEVICE AND COMPANY: DUOLITH® SD1 ultra, Storz Medical
COI: No conflict of interest

POSTER PRESENTATION

TREATING GREATER TROCHANTER PAIN SYNDROME (GTPS) WITH A FOCUS ON MYOFASCIAL COMPONENTS: A LONGITUDINAL STUDY IN PRIVATE PRACTICE

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INTRODUCTION

Greater Trochanteric Pain Syndrome (GTPS) is a common disabling long-term condition. Patients with GTPS reported long term pain, and significant limitations to individual's activities and full-time employment. Identifying efficient short and long treatments for people with GTPS is a priority. People with GTPS have reported a wide range of pain locations in addition to the area over the greater trochanter, notably, the buttock region. We hypothesize that that addressing the muscle pain associated with GTPS would have a beneficial effect on the patient and that age and BMI may influence the outcome of the treatment.

MATERIAL & METHOD

Longitudinal quasi-experimental study conducted in primary care Aalborg, Denmark, including 56 female patients with GTPS, assessed via MRI and treated with fESWT (The Intelect® Focus Shockwave) The treatment area was individualised to the participant's myofascial lateral hip pain areas. Energy flux was individualized to the patient's pain tolerance. Pain was assessed via a numeric rating scale (NRS) (0=no pain and 100 worst pain), function via the Patient Specific Functional Scale (PSFS), and disability via the VISA-G.DK, at baseline and six weeks post final treatment. Adverse events were recorded. Participants were provided with education around avoiding provocative activities. Statistical Analysis Continuous variables are given as the mean and standard deviation (SD). Statistics were performed by SPSS Statistics for Mac, version 28 (SPSS Inc., Chicago, IL, USA)

RESULTS

MRI confirmed gluteal tendinopathy in 75% of the participants.

Table 1. Mean scores of visual analogue pain scale, Patient Specific Functional Scale (3 item) and the VISA-G. Dk recorded over time

	1 SESSION	2 SESSION	3 SESSION	6 WEEKS AFTER 3 SESSION
AVERAGE PAIN DURING LAST WEEK	61.96, 18.92	55.32, ± 19.41	44.98, ± 20.02	30.18, ± 16.85*
WORTS PAIN LAST 24 HOURS	65.36, ±22.64	62.96, ± 22.15	51.29, ± 23.21	43.51, ± 19.50*
LEAST PAIN LAST 24 HOURS	38.21, ± 25.16	41.62, ± 24.34	28.70, ± 19.54	12.14, ± 13.17 *
PSFS	9.93, ± 5.39			18.22, ± 5.36*
VISA-G	58.18, ± 14.07	58.82, ± 14.31	62.38, ± 14.02**	71.86, ± 15.21**

Raw data as expressed as mean, ± standard deviation. * MCID of 20 points. * Minimal detectable change large, 2.7 points, ** Minimal detectable change (3.17)

Table 2. Mean fESWT treatment parameters

	1 SESSION	2 SESSION	3 SESSION
MEAN NO OF SHOTS	3306	3545	3543
MEAN ENERGY FLUX RANGE (mJ/mm2)	0.05 - 0.55	0.02 - 0.45	0.02 - 0.45
MEAN TOTAL DOSAGE (JOULES)	16.46	22.18	22.46

DISCUSSION

Our patients reported a reduction in pain and improvement in function following treatment that addressed muscle discomfort, and education. These results are in line with previous investigated conservative treatment where ESWT was shown to improvement function and reduce disability in the short term (1-3 months). Positive associations between pain severity and mechanical hyperalgesia in patients with GTPS, at remote sites, have been reported, which may be the explanation for the pain sites described by some GTPS patients. The reduction in pain and facilitation of higher functional levels may be a window of opportunity for other more active treatment modalities, for example strength training. We suggest treatment addressing the most tender part of the muscle should be incorporated into the treatment of GTPS.

TECHNOLOGY: Focused Shockwave
DEVICE AND COMPANY: The Intelect® Focus Shockwave) (Chatanooga Intelect® Focus Shockwave, n.d.
COI: No conflict of interest

POSTER PRESENTATION

FOCUSED SHOCKWAVE THERAPY FOR TRIGGER FINGER: A CLINICAL STUDY

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INTRODUCTION

Trigger finger is a common finger aliment. It is caused by inflammation and subsequent narrowing of the A1 pully. Symptoms of trigger finger are pain, snapping, and loss of motion of the affected finger. Treatment of trigger finger modalities splinting, injection, and surgeon, and so on. Corticosteroid injection and surgical release are very effective treatment. But they have a risk of infection, because of invasive treatment. So alternative treatments are sought to minimize invasiveness and enhance patient outcomes. Focused shockwave therapy (FSW) has emerged as a potential treatment, but questions persist regarding optimal energy levels and patient response. In this study, we investigate the use of FSW for trigger finger and evaluate its clinical efficacy.

MATERIAL & METHOD

We conducted a retrospective analysis of 116 patients diagnosed with trigger finger who underwent FSW treatment. The FSW sessions were administered using a device calibrated to individual pain tolerance levels. Among the cases, 18 received FSW at energy levels below 0.1 mJ. Pain assessment was performed using the Numeric Rating Scale (NRS), comparing pre- and post-treatment scores. Functional improvements and adverse effects were also documented.

RESULTS

Our findings indicate that FSW effectively reduced pain associated with trigger finger. Notably, even at lower energy levels (below 0.1 mJ), patients reported significant pain relief. No adverse effects related to FSW were observed. Functional improvements, including enhanced finger mobility and reduced triggering, were evident in the majority of cases.

DISCUSSION

FSW offers several advantages as a treatment modality for trigger finger. Its non-invasive nature appeals to patients seeking alternatives to surgery. However, the variability in FSW output across cases warrants further investigation. Individualized treatment planning, considering patient tolerance and response, is crucial for optimizing outcomes. Focused shockwave therapy represents a meaningful therapeutic approach for trigger finger. Clinicians should tailor treatment parameters to individual needs, balancing pain relief with energy levels. Further research is needed to explore long-term effects and refine FSW protocols for optimal patient outcomes.

TECHNOLOGY: Focused Shockwave
DEVICE AND COMPANY: Storz Medical
COI: No conflict of interest

POSTER PRESENTATION

SUCCESSFUL APPLICATION OF LONG POST-COVID VACCINE PATIENT WITH SIGNIFICANT FATIGUE AND POST-EXERTIONAL MALAISE USING PULSED ELECTROMAGNETIC FIELDS: A CASE STUDY

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INTRODUCTION

This case study reports the outcome of EMTT treatment utilizing the novel Magnetolith, which has a faster oscillation and deeper penetration than the earlier model PEMF technology, on a patient experiencing chronic fatigue and post-exertional malaise, PEM, following a Covid vaccine of over 2 years duration.

MATERIAL & METHOD

A 55 year old male neuro-psychologist who had been experiencing significant fatigue and PEM for over 2 years since receiving a Covid vaccine was treated with EMTT.
The Storz Magnetolith device was used for 6 treatments with each treatment lasting approximately 50 minutes. 2500 pulses @ 8-8 B/L lungs, 2500 pulses @ 8-8 pelvic floor, 3000 pulses 8-8 sternum, 3000 8-8 adrenals/ epigastric, 3500 pulses 8-8 soles of feet.

RESULTS

The patient had complete resolution of his chronic fatigue symptoms after 5 visits and was able to resume exercise, running, without experiencing the post-exertional malaise which he had been experiencing for over 2 years. He was released after 6 visits and at a 5 month follow up he remained asymptomatic with no return of the fatigue and PEM that he had experienced for over 2 years post Covid vaccine.

DISCUSSION

Post-Covid fatigue along with post exertional malaise, PEM, are common symptoms of Covid-19 survivors, whether from the virus itself or the vaccine, it remains a significant consequence for many patients. There are few case studies available that address post-Covid patients with pulsed electromagnetic fields. I am aware of only 2 case reports with EMTT on long Covid fatigue and one research study on long Covid pneumonia. These 3 studies all used different PEMF devices and their treatment course lasted from 1-12 procedures. This is the only case report that I am aware of using the novel Magnetolith device. I am excited to be able to present another case study that supports these findings and is able to have such a positive effect on a patient's quality of life with only 6 treatments. Regarding the Magnetolith, the effects of the faster oscillation coupled with the deeper penetration on a cellular level allow for a more significant effect. It is hypothesized that EMTT is having an effect on the sodium/ion channels that are able to modify cellular functions. As we struggle globally with continued long haul Covid sequelae EMTT can offer an exciting treatment option to provide an affordable, effective, conservative treatment where there are few treatment options available.

TECHNOLOGY: Focused Shockwave
DEVICE AND COMPANY: Magnetolith Storz/ Duolith SD1 Storz
COI: No conflict of interest

POSTER PRESENTATION

RETURN TO SPORTS OF NAVICULAR BONE STRESS INJURIES USING FOCUSED SHOCK WAVE

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INTRODUCTION

Bone stress injuries (BSI) of the navicular, which are often seen in the sports that involve frequent jumping, running, and sprinting, are one of the high-risk stress fractures that tend to cause non-union and delayed union, which may delay return to sports. Because focused shock wave (FSW) has been used and found useful for bone pathologies, we have used FSW for early return to sports. In this retrospective study, we investigated the return to sports of navicular BSI treated with FSW.

MATERIAL & METHOD

From 2015 to 2021, 10 patients (7men and 3women) underwent FSW for BSI of navicular. All patients participated in sports. According to the classification of navicular BSI, there were 4 cases of Type 0.5, 2 cases of Type 1, 4 cases of Type 2. We used DUOLITH® SD1 (STORZ MEDICAL AG) for all patients. The FSW protocol was 0.08~0.25mJ/mm2, 3000 shots,3 sessions. We evaluated bone healing by CT scan or MRI before and after FSW. We investigated the duration until bone union and the presence of complications such as non-union and recurrence. We also checked the time of return to the sports activity. The patient was allowed to return to sports, starting with gradual participation in a pain-free range of practice, once imaging showed a trend toward bone healing and the tenderness had resolved.

RESULTS

There was no complication after FSW. According to the CT scan or MRI evaluation, bone healing was achieved in all patients. The average of bone healing duration 10.7 weeks from FSW started. At the final follow-up, all patients were able to return to their previous level of sports activity. The average partial return to sport was 5.8 weeks, and the average complete return to sport was 10.8 weeks.

DISCUSSION

BSI of the navicular is currently considered high risk due to the rate of non-union. It is recommended that about 6 weeks of non-weight bearing is needed as a conservative treatment. We treated the patients with FSW to return them to play as early as possible without the requirement of non-weight bearing. This allowed us to start rehabilitation earlier and the patient was able to return to sport sooner. Evidence-based recommendations for BSI of the navicular for return to play are poorly described. However, FSW is a minimally invasive and effective treatment for BSI of the navicular. Therefore, we believe that this treatment may be the first option for conservative treatment, especially for athletes.

TECHNOLOGY: Focused Shockwave
DEVICE AND COMPANY: DUOLITH® SD1 (STORZ MEDICAL AG)
COI: No conflict of interest

POSTER PRESENTATION

FOCUSED EXTRACORPOREAL SHOCK WAVE IS EFFECTIVE FOR FATIGUE FRACTURES OF THE PROXIMAL PHALANGES OF BILATERAL GREAT TOES: A CASE REPORT.

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INTRODUCTION

Fatigue fractures of the proximal phalanx of the great toe are uncommon, with limited reports on treatment outcomes, particularly in cases involving bilateral fractures. Existing literature primarily emphasizes surgical interventions, and the efficacy of conservative management is yet to be firmly established. We present a case report suggesting the potential benefits of focused extracorporeal shock wave therapy (F-SW) in the conservative treatment of fatigue fractures of the proximal phalanx of bilateral great toes.

MATERIAL & METHOD

A 14-year-old male sprinter developed pain in both great toes during sports activities and was referred to our department from an orthopedic clinic. Computed tomography (CT) revealed oblique fracture lines extending from the proximal metaphysis to the proximal diaphysis on the proximal phalanx of bilateral great toes, and magnetic resonance imaging (MRI) showed high signal intensity within the bone marrow on T2 fat-suppressed images. The absence of a traumatic history led to fatigue fractures. With an upcoming competition, we initiated conservative therapy, including F-SW to both great toes and the use of foot orthosis. One month after the initiation of therapy, the tenderness subsided, enabling the athlete to return to athletic activities. He participated in a competition two months after the start of F-SW. A follow-up CT at 5 months from the initiation of treatment indicated bilateral bone union progression, allowing the athlete to continue competing without experiencing pain.

RESULTS

blank

DISCUSSION

F-SW facilitated bone healing in fatigue fractures of the proximal phalanx of both great toes, proving to be a valuable intervention for the early return to athletic competition. The results suggest that F-SW can play a significant role in promoting bone union in cases of fatigue fractures of the proximal phalanx of both great toes. This case highlights the potential benefits of F-SW as a non-surgical approach in the management of such injuries, contributing to the limited body of literature on conservative treatments for this condition.

TECHNOLOGY: Focused Shockwave
DEVICE AND COMPANY: Duolith SD-1 Ultra, Storz Medical
COI: No conflict of interest

POSTER PRESENTATION

LOW INTENSITY SHOCKWAVE THERAPY FOR ERECTILE DYSFUNCTION: RESULTS OF THE SHAM TREATMENT

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[2]Institute for Sexual Medicine, sexual medicine, San Diego, USA

INTRODUCTION

A sham-controlled, randomized prospective trial in men with erectile dysfunction was performed using an electrohydraulic shockwave device (Softwave MTS/Urogold 100TM, TRT).

MATERIAL & METHOD

In this single-blind study participants completed the International Index of Erectile Function (IIEF) and underwent assessment of grayscale ultrasound corpora cavernosa erectile tissue homogeneity and of Doppler ultrasound end diastolic velocity (EDV) and peak systolic velocity (PSV) values at baseline. Participants were randomized 2:1 to receive low intensity shockwave therapy (LiSWT) (4 Hz, 0.12 mJ/mm2) or sham. Once the participant lay supine, a curtain blocked visualization of the shockwave device and noise reducing headphones muffled the shockwave sounds. The probe was applied to the right and left hilum and the right and left penile shaft. The participant was subsequently placed in the lithotomy position, the scrotum elevated, and the probe applied to the right and left penile crura. Treatment was provided to all these regions as per protocol. For sham treatment, when the probe was placed on the various locations, a high-quality recording of shockwave sounds was activated. For Arm 1 active treatment, 5000 shocks were delivered every 3 weeks for three treatments. For Arm 2 active treatment, 5000, 3000, 3000 shocks were delivered during weeks 1, 2, 3, respectively, followed by an identical cycle of treatment 3 weeks later. Subjects were provided Sexual Encounter Profile (SEP) diaries to complete after sexual activity in the 4 weeks prior to a follow up visit when the IIEF was repeated. Grayscale/Doppler ultrasound images were obtained at baseline and week 20. Visual grading scores were used to assess hypoechoic regions in the corpora cavernosa and peak systolic velocity (PSV) and end diastolic velocity (EDV) values were measured. Participants completing sham treatment crossed over to LiSWT at this visit. Data were analysed by 2-way repeated measures ANOVA with Geisser-Greenhouse correction. Pairwise comparisons were performed to baseline using Dunnett's multiple comparison test. Missing data were imputed by "last observation carried forward".

RESULTS

35 participants (22 active, 13 sham) were randomized. Sham treatment showed no statistically significant difference from baseline to week 20 follow up for corpora cavernosa homogeneity/inhomogeneity, PSV, EDV, total IIEF and Erectile Function domain, and SEP diary scores.

DISCUSSION

This demonstrates that sham LiSWT treatment, delivering no actual shockwave energy, has no statistically significant effect on erectile function efficacy outcome measures.

TECHNOLOGY: Focused Shockwave
DEVICE AND COMPANY: Softwave Urogold 100 by TRT/MTS
COI: Conflict of interest
Please, specify your conflict of interest:
advisory board, TRT

POSTER PRESENTATION

TREATING BONE MARROW EDEMA IN PRIMARY CARE – IS IT FEASIBLE? A CASE STUDY

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INTRODUCTION

Bone marrow lesions (BMLs) are often seen either in combination with or without a structural lesion in the knee. There is a lack of a definite treatment for this condition in the literature. Extracorporeal Shockwave (ESWT) is believed to be an effective, reliable, and non-invasive technique for rapid treatment of BML. To our knowledge this has not been described before in primary care, as standard treatment being a wait and see approach, focusing on rest or unloading. MRi findings of cystic cavity in the subchondral bone and surroundings of the medial femoral condyle. BML edema, buckling of hyaline cartilage, location of irregular cartilage on the center of the weight-bearing surface and absence of sharp margins crossing anatomical boundaries. The MRi characteristics of BML include hypodense lesions on T1-weighted sequences and hyperdense lesions on T2-weighted sequences.

MATERIAL & METHOD

The patient was a janitor on sick leave for 4 weeks, pain had persisting for 3 months, and worsening. Subsequently seen in secondary care due to intolerable right sided knee pain affecting daily living and work and referred on to ESWT treatment. The treatment area was prepared with a coupling gel,2500 impulses at a frequency of 3 to 4Hz, at a high energy flux density of >0.1-0.2 mJ/mm2. Three sessions with one week intervals. Tender sites were treated for 300 impulses, guided by the MRI image. The patient was made aware that the treatment would cause some pain, however refraining to allow an increase in the energy flux more than an acceptable pain level. The treatment source was the Intelect® Focus Shockwave, short standoff, focal range max 30 mm, focal zone 15-45 mm, therapeutic effectiveness 0-105 mm. Outcome values obtained by numeric pain rating scale (NRS), Functional scales of Lower Extremity Functional Scale (LEFS) Patient Specific Functional Scale (PSFS), registered at baseline and 12 weeks after third treatment.

RESULTS

Fig 1. Preliminary MR scan visualizing the BML before treatment. Arrow depicting the BML.

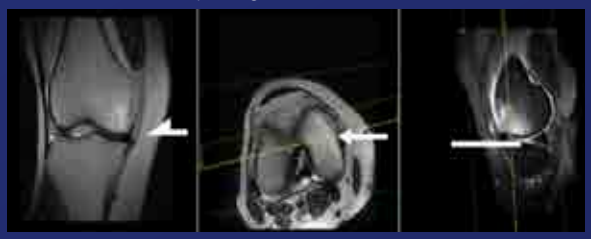
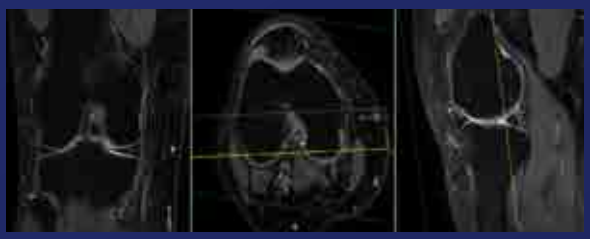


Fig 2. MR scan showing complete resolution after 12 weeks after third treatment.



The BML completely resolved after 12 weeks. Minimal clinical differences were achieved in NRS score (0-10) (decrease of 2 points), LEFS (increase of 28 points,) PSFS (decrease of 18 points).

DISCUSSION

This study is first to document the feasibility and safety of treating BML in primary care with very good results. This may save time and be financially more viable than treatment in secondary care. Further large scale studies are recommended.

TECHNOLOGY: Focused Shockwave
Device and Company: Intelect® Focus Shockwave, Chatanooga
COI: No conflict of interest

POSTER PRESENTATION

COMMON MISINTERPRETED ADVERSE EFFECTS WHEN TREATING CALCIFIC TENDINALGIA - A SERIE OF CASES WHERE ULTRASONOGRAPHY MADE A BIG DIFFERENCE

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INTRODUCTION

A sham-controlled, randomized prospective trial in men with erectile dysfunction was performed using Calcific tendinalgia(CT) is a common cause of pain in the rotator cuff, but also in other tendons. It is accepted that CT can be treated with shockwave therapy (ESWT) for management of symptoms and resolution of calcific deposits (CD). The treatment is an alternative to interventional options such as surgery. Some side effects are considered normal with ESWT, such as soreness, redness of the skin and haematoma. Through our work with ESWT and CT a few patients have reported adverse effects, mostly pain augmentation which could be interpreted as unsuccessful treatments. However, after thorough ultrasonography, the increased pain could be considered normal and in some cases a sign of positive effect.

MATERIAL & METHOD

In this report 6 cases of CT are presented. The data has been collected through our clinical work in Stockholm Sweden. Four cases are involving supraspinatus, one case common extensor origin (CEO) at the lateral elbow and one case reflective rectus femoris (RF) tendon. Medium to high energy levels (0.15-0.35mJ/mm2) has been used in all cases.

RESULTS

Three of the supraspinatus cases are spontaneous evacuations of the CD into the bursa with following acute inflammation. In one case a spontaneous resolution without any further need for intervention, whereas in one case a corticosteroid injection (CSI) was required to manage the pain. In one of the cases an aspiration from the bursa was performed and CSI. At one month follow up all 3 cases were considerably ameliorated. Another case is a CD in supraspinatus classified as grade 1 according to Gärtner. Before the treatment another healthcare professional made a lavage without any success. After 5 ESWT treatments and 3 months follow up, the CD remained with persistent pain and dysfunction. However, the characteristics of the deposit had changed to a grade 2, and lavage could successfully be carried out. Both the CEO and RF cases reported severe pain after 1 single treatment, but at follow up 3w later no CD remained.

DISCUSSION

We believe that by following the treatment with ultrasonography, it is easier to monitor side effects and thereby avoid misleading clinical presentations of common side effects that could lead to faulty decisions in the treatment plan when handling CD patients.

TECHNOLOGY: Focused Shockwave and Radial Pressure Waves
DEVICE AND COMPANY: Duolith SD-1 T-Top, mp100
COI: No conflict of interest

POSTER PRESENTATION

COMBINED USE OF LIESWT/ EMTT IN THE TREATMENT OF PELVIC FLOOR DYSFUNCTION RESULTING IN STRESS URINARY INCONTINENCE: A CASE REPORT

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INTRODUCTION

Stress Urinary Incontinence, the involuntary leakage of urine upon physical exertion, has a prevalence in the female population estimated at 25-35% and up to 50% worldwide.
Most treatments available are only able to treat the symptoms and not the underlying pathology.
Pelvic floor dysfunction results in hypermobility of the urethra and other related structures as well as decreased engagement of primary pelvic stabilizing musculature. LiESWT is shown to be an effective treatment for chronic pelvic pain syndrome.
Combining this treatment along with EMTT, specifically with the novel Magnetolith, is shown to be an effective treatment option and coupled with ESWT can optimize the treatment outcome.

MATERIAL & METHOD

A 69 year old female who has had Stress Urinary Incontinence for approximately 10 years had noticed increasing symptoms for the past year with increasing discomfort and urgency with physical exertion.
She received 8 visits of LiESWT combined with EMTT for 2/week for 4 weeks.
The LiESWT was applied at 0.25 mj/mm2 @3000 pulses at 4 Hz.
The target tissue was the superior pubic ramus, left, right, and central for 1000 pulses each angled at 45 degrees. EMTT with the Magnetolith was applied for 4000 pulses @ 8-8 intensity/frequency and was targeted over the pubic bone to address the pelvic floor.
Her pre-treatment OABS, overactive bladder symptom score, was categorized at a 12/15 for a moderate overactive bladder score.

RESULTS

Pre-treatment score on the OABSS was 12/15 for moderate OAB/ SUI.
She was treated 2x/ week for 4 weeks
At 1 week post-treatment her OABSS was reduced to 9/15 still considered moderate OAB/ SUI .
At 2 week post- treatment her OABSS was reduced to 4/15 indicating mild OAB/SUI.
At 3 week post-treatment her OABSS was reduced to 3/15 indicating mild OAB/SUI.
Post 4 week treatment her OABSS was reduced to a 1/15 indicating mild-non existent OAB/SUI
The patient noted that at the end of her treatment course she was back to her status of one year earlier.

DISCUSSION

There is a need to be able to provide treatment to address the cause of the stress urinary incontinence / pelvic floor dysfunction issue and not just the symptoms.
Currently there are limited non-invasive options.
There is research to support shockwave therapy - here we see that coupling it with the novel Magnetolith enhances the treatment and ultimately is able to reduce the treatment times significantly enough to warrant further research.
It provides a cost effective solution to a condition that causes distress to a significant percentage of the female population.

TECHNOLOGY: Focused Shockwave
DEVICE AND COMPANY: Storz Duolith SD 1, Storz Magnetolith
COI: No conflict of interest

POSTER PRESENTATION

THE EFFICACY OF FOCUSED EXTRACORPOREAL SHOCKWAVE THERAPY FOR FABELLA SYNDROME: A CASE REPORT

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INTRODUCTION

The fabella is a sesamoid bone that resides within the posterolateral corner (PLC) of the knee, embedded within the tendon of the lateral head of gastrocnemius muscle. This region is considered by clinicians "the dark side" of the knee due to its complex anatomy, biomechanics, and intimate relationship with large vessels and nerve trunks of the popliteal fossa. When present, the fabella can cause irritation of the lateral femoral condyle and intermittent pain, a phenomenon referred to as "fabella syndrome". Although several conservative treatments have been proposed, they often fail to achieve a persistent relief of symptoms. Thus, surgical excision may be considered. In an attempt to avoid any invasive procedure, we investigate the effects of focal extracorporeal shockwave therapy (fESWT) as a novel conservative treatment for the rehabilitation of fabella impingement syndrome.

MATERIAL & METHOD

A 66-year-old male patient presented himself to the Center for Rehabilitative Medicine "Sport and Anatomy" of the University of Pisa with a history of persistent pain of unknown origin at the PLC of the left knee and functional limitations, lasting over 3 months. No previous history of injury or trauma was reported. US evaluation revealed a hypertrophic fabella chronically impinging on the common peroneal nerve on knee flexion. The patient underwent a cycle of fESWT using a DUOLITH® SD1 ultra (Storz Medical). Four sessions were administered at weekly intervals, at a frequency of 5 Hz, 1500 pulses/session (0.20 mJ/mm2, 10000 mJ per session). No specific side effect was reported. Clinical outcome scores of the following domains were collected: change in pain severity on the NRS scale and patient satisfaction.

RESULTS

At one month follow-up, the patient reported only a slight reduction in knee discomfort. A substantial improvement was seen in reported pain at 3 months where the pain decreased to 0 point on the NRS scale. This effect was maintained for up to 12 months. Functional improvements were observed already at short-term follow-up where full extension of the knee was achieved. Overall, the patient reported positive impression of the treatment outcomes.

DISCUSSION

In the present case report, fESWT produced an immediate and dramatic reduction of symptoms In. particular, fESWT resulted in long-term benefits and no recurrence of painful symptoms or dysfunction was observed for more than 12 months. To the best of our knowledge, no previous research has investigated the effectiveness of this conservative treatment for the management of Fabella syndrome.

TECHNOLOGY: Focused Shockwave
DEVICE AND COMPANY: DUOLITH® SD1 ultra (Storz Medical)
COI: No conflict of interest

POSTER PRESENTATION

RANDOMIZED CONTROLLED TRIAL FOR USE OF LOW INTENSITY SHOCKWAVE FOR PATIENTS WITH DYSPAREUNIA

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INTRODUCTION

Dyspareunia, either independent of or in combination with pelvic pain, has been reported to have a significant effect on mental and physical health, and on quality of life in women. Prevalence rates ofdyspareunia have been reported to be between 3-18% of the population worldwide. Prior research has shown physical therapy to be an effective treatment resulting in decreased pain with vaginal penetration in women with dyspareunia. Low intensity shockwave therapy (LiSWT) has been researched in other pelvic health conditions such as chronic prostatitis, erectile dysfunction (ED) and male chronic pain. Research in female pelvic pain and more specifically in dyspareunia is lacking. However, successful application of LiSWT by the first author for treatment of dyspareunia serves as the basis for this clinical trial. The purpose of this abstract is to describe a study investigating the effectiveness of LiSWT for patients with dyspareunia.

MATERIAL & METHOD

Material & Method: Using a single-blind randomized controlled trial with randomized placebo phase design,60 participants will be recruited from 4 private practice, outpatient physical therapy clinical sites across the United States. Inclusion criteria: Primary diagnosis of dyspareunia, cisgender female or have natal vaginal tissue, aged 21-65 years old, has not started hormone therapy within the past 2 weeks, has not received pelvic floor physical therapy within the past 4 weeks and are able to participate consistently 1 time per week for 4weeks of treatment. Participants will receive individualized physical therapy treatment with or without active LiSWT 1 time per week for 4 weeks with follow-up at 3 months. Active LiSWT will be delivered using an OrthoGold 100® device, with 500-1,500 shocks, 2.5-4.0Hz, and 4-8 energy. Participants initially randomized into the sham group may receive active shockwave following the 4 weeks of individualized physical therapy with sham shockwave.

RESULTS

Results: Outcome measures will include the Female Sexual Functioning Index and the Beck Depression Inventory to assess sexual function and quality of life, Tampon Test as an alternate to sexual intercourse pain, dilator size assessing vaginal tissue accommodation, and numeric pain rating with penetration.

DISCUSSION

Discussion: To date we have 11 participants enrolled in the study, 6 randomized to active shockwave and 5 randomized to sham shockwave.

TECHNOLOGY: Focused Shockwave
DEVICE AND COMPANY: Softwave TRT Orthogold 350
COI: Conflict of interest
Disclosure: This study was sponsored by Softwave Tissue Regeneration Technologies, LLC

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