Dr. Rob Gordon **Erectile Dysfunction & Shock Wave Therapy**

Searched: Medline 1996-2016; Embase 1996-2016 – limited to humans, English language, articles
October 3, 2016

1.
Safety and efficacy of low intensity shockwave (LISW) treatment in patients with erectile dysfunction.
Ruffo A; Capece M; Prezioso D; Romeo G; Illiano E; Romis L; Di Lauro G; Iacono F.
International Braz J Urol. 41(5):967-74, 2015 Sep-Oct.
[Evaluation Studies. Journal Article]
UI: 26689523
UNLABELLED: The primary goal in the management strategy of a patient with ED would be to determine its etiology and cure it when possible, and not just to treat the symptoms alone. One of the new therapeutic strategies is the use of low intensity extracorporeal shockwave (LISW) therapy. The mechanism of shockwave therapy is not completely clear. It is suggested that LISW induces neovascularization and improvement of cavernosal arterial flow which can lead to an improvement of erectile function by releasing NO, VEGF and PCNA.
MATERIALS AND METHODS: 31 patients between February and June 2013 with mild to severe ED and non-Phosphodiesterase 5 inhibitors responders were enrolled. Patients underwent four weekly treatment sessions. During each session 3600 shocks at 0.09mJ/ mm2 were given, 900 shocks at each anatomical area (right and left corpus cavernosum, right and left crus). Improvement of the erectile function was evaluated using the International Index of Erectile Function (IIEF-EF), the Sexual Encounter Profile (SEP) diaries (SEP-Questions 2 and 3) and Global Assessment Questions (GAQ-Q1 and GAQ-Q2).
RESULTS: At 3-month follow-up IIEF-EF scores improved from 16.54+/-6.35 at baseline to 21.03+/-6.38. Patients answering 'yes' to the SEP-Q2 elevated from 61% to 89% and from 32% to 62% in the SEP-Q3. A statistically significant improvement was reported to the Global Assessment Questions (GAQ-Q1 and GAQ-Q2).
CONCLUSION: In conclusion, we can affirm that LISW is a confirmed therapeutic approach to erectile dysfunction that definitely needs more long-term trials to be clarified and further verified.

2.
Can low-intensity extracorporeal shockwave therapy improve erectile dysfunction? A prospective, randomized, double-blind, placebo-controlled study.
Olsen AB; Persiani M; Boie S; Hanna M; Lund L.
Scandinavian Journal of Urology. 49(4):329-33, 2015.
[Journal Article. Randomized Controlled Trial]
UI: 25470423
OBJECTIVE: The aim of this study was to investigate whether low-intensity extracorporeal shockwave therapy (LI-ESWT) can be used as a treatment for men with erectile dysfunction of organic origin.

MATERIALS AND METHODS: This prospective, randomized, blinded, placebo-controlled study included 112 men unable to have intercourse either with or without medication. Erectile dysfunction was assessed at screening and 5, 12 and 24 weeks after treatment. Assessment was performed by interview and using the Erection Hardness Scale (EHS) and the International Index of Erectile Function (IIEF-15) questionnaire. The men were randomly assigned either to LI-ESWT (n = 51, active group) or placebo (n = 54, placebo group). They received five treatments over 5 weeks. Both the participants and the doctors were blinded to the treatment. After 10 weeks, the placebo group received active treatment (active placebo group).
RESULTS: Twenty-nine men (57%, active group) were able to obtain an erection after treatment and to have sexual intercourse without the use of medication. In the placebo group, only five men (9%) showed similar results (p = 0.0001). The EHS after 5 weeks showed that men in the active group experienced a significant improvement in their erectile dysfunction, but no significant result was found with the use of the IIEF - Erectile Function domain.
CONCLUSIONS: This placebo-controlled study over 5 weeks shows that 57% of the men who suffered from erectile dysfunction had an effect from LI-ESWT. After 24 weeks, seven (19%, active group) and nine (23%, active placebo group) men were still able to have intercourse without medication. This study shows a possible cure in some patients, but more research, longer follow-up in the placebo group and an international multicentre randomized study are needed.

3.

Evaluation of clinical efficacy, safety and patient satisfaction rate after low-intensity extracorporeal shockwave therapy for the treatment of male erectile dysfunction: an Australian first open-label single-arm prospective clinical trial.

Chung E; Cartmill R.
BJU International. 115 Suppl 5:46-9, 2015 Apr.
[Clinical Trial. Journal Article]
UI: 25828173

OBJECTIVE: To evaluate the efficacy, safety and patient satisfaction rate with low-intensity extracorporeal shockwave therapy (LiESWT) in Australian men with erectile dysfunction (ED), as LiESWT induces neovascularisation and potentially enhances penile perfusion and improves erectile function.
PATIENTS AND METHODS: Open-label single-arm prospective study of patients with ED with five-item version of the International Index of Erectile Function (IIEF-5) scores of >12 at baseline were enrolled after informed consent. Patient demographics, change in IIEF-5 and Erectile Dysfunction Inventory of Treatment Satisfaction (EDITS) scores, and overall satisfaction score (on a 5-point scale) were recorded. Treatment consists of 3000 shockwaves (1000 shockwaves to the distal penis, base of penis and corporal bodies at the perineum) twice weekly for 6 weeks.
RESULTS: All patients had tried and failed oral phosphodiesterase type 5 inhibitors and most of the patients hah had ED for >18 months [mean (range) 21.8 (6-60) months]. No side-effects to LiESWT were reported. Most patients reported an improvement in IIEF-5 score by 5 points (60%) and EDITS Index score by >50% (70%). Most patients were satisfied (scoring 4 out of 5; 67%) and would recommend the therapy to their friends (80%).
CONCLUSION: LiESWT appears to improve erectile function, is safe and potential plays an important role in penile rehabilitation in men whom failed medical therapy.

4.

Extracorporeal shockwave therapy in the treatment of erectile dysfunction: a prospective, randomized, double-blinded, placebo controlled study.

Yee CH; Chan ES; Hou SS; Ng CF.

International Journal of Urology. 21(10):1041-5, 2014 Oct.

[Journal Article. Randomized Controlled Trial]

UI: 24942563

OBJECTIVES: To investigate the role of low-intensity extracorporeal shockwave therapy in the treatment of erectile dysfunction.

METHODS: This was a double-blinded, single-center, prospective, randomized, placebo-controlled trial. After a 2-week phosphodiesterase type5 inhibitor washout period, patients were assessed with Sexual Health Inventory for Men, International Index of Erectile Function-ED domain scores and Erection Hardness Score. Randomization into either the low-intensity extracorporeal shockwave therapy group or the sham group took place. After the 9-week treatment period, patients were followed up 4 weeks later. Follow-up assessment was in the form of International Index of Erectile Function-ED domain score and Erection Hardness Score.

RESULTS: A total of 70 patients were recruited into the study, 58 patients completed the study. A total of 28 patients were randomized into the sham therapy arm, and 30 patients were randomized into the low-intensity extracorporeal shockwave therapy arm. There was no significant difference between these two groups in baseline International Index of Erectile Function-ED domain score and Erection Hardness Score. The mean International Index of Erectile Function-ED domain score of the low-intensity extracorporeal shockwave therapy arm and sham arm in week 13 were 17.8+/-4.8 and 15.8+/-6.1, respectively (P=0.156). The mean Erection Hardness Scores in week13 were 2.7+/-0.5 and 2.4+/-0.9, respectively (P=0.163). When patients were stratified into different baseline Sexual Health Inventory for Men subgroups, the pre-intervention and post-intervention difference in low-intensity extracorporeal shockwave therapy was found to be significant in the subgroup with severe erectile dysfunction (low-intensity extracorporeal shockwave therapy International Index of Erectile Function-ED domain improvement: 10.1+/-4.1 vs sham therapy International Index of Erectile Function-ED domain improvement: 3.2+/-3.3; P=0.003).

CONCLUSION: The present trial shows the tolerability and clinical efficacy of low-intensity extracorporeal shockwave therapy in a subgroup of patients with erectile dysfunction.

6.

Efficiency assessment of shock wave therapy in patients with pelvic pain employing harmonic analysis of penile bioimpedance.

Khodyreva LA; Dudareva AA; Mudraya IS; Markosyan TG; Revenko SV; Kumachev KV; Logvinov LA.

Bulletin of Experimental Biology & Medicine. 155(2):288-92, 2013 Jun.

[Journal Article]

UI: 24131011

In searching for novel objective methods to diagnosticate pelvic pain and assess efficiency of analgesic therapy, 37 male patients were examined prior to and after the course of extracorporeal shock wave therapy (5-10 sessions) with the waves directed to projections of prostate and/or crura and shaft of the penis. The repetition rate of mechanical pulses was 3-5 Hz. The range of energy pulse density was 0.09-0.45 mJ/mm(2). The overall number of pulses in

a session was 1500-3000 in any treated zone with total energy smaller than 60 J. The applicator was relocated every other series of 300-500 pulses. Effect of the shock wave therapy was assessed according to subjective symptomatic scales: International Prostate Symptom Score, International Index of Erectile Function, Quality of Life, and nociceptive Visual Analog Scale. The objective assessment of shock wave therapy was performed with harmonic analysis of penile bioimpedance variability, which quantitatively evaluated the low-frequency rhythmic and asynchronous activities at rest as well as the total pulsatile activity of the penis. The magnitude of spectrum components of bioimpedance variations was assessed with a novel parameter, the effective impedance. The spectral parameters were measured in 16 patients prior to and after the treatment course. The corresponding control values were measured in the group of healthy patients. Prior to the shock wave therapy course, all spectrum parameters of penile bioimpedance significantly differed from the control ($p<0.05$). After this course, low-frequency rhythmic and the total pulsatile activity decreased to normal, while asynchronous activity remained significantly different from the normal. The novel objective physiological criteria of pelvic pain diagnostics and efficiency of its treatment reflecting the regional features of circulation and neural activity corresponded to the clinical symptom scaling prior to and after the shock wave course, and on the whole, these criteria corroborated improvement of the patient state after this therapy.

7.

Does low intensity extracorporeal shock wave therapy have a physiological effect on erectile function? Short-term results of a randomized, double-blind, sham controlled study.

Vardi Y; Appel B; Kilchevsky A; Gruenwald I.

Journal of Urology. 187(5):1769-75, 2012 May.
[Journal Article. Randomized Controlled Trial. Research Support, Non-U.S. Gov't]
UI: 22425129

PURPOSE: We investigated the clinical and physiological effect of low intensity extracorporeal shock wave therapy on men with organic erectile dysfunction who are phosphodiesterase type 5 inhibitor responders.
MATERIALS AND METHODS: After a 1-month phosphodiesterase type 5 inhibitor washout period, 67 men were randomized in a 2:1 ratio to receive 12 sessions of low intensity extracorporeal shock wave therapy or sham therapy. Erectile function and penile hemodynamics were assessed before the first treatment (visit 1) and 1 month after the final treatment (followup 1) using validated sexual function questionnaires and venoocclusive strain gauge plethysmography.
RESULTS: Clinically we found a significantly greater increase in the International Index of Erectile Function-Erectile Function domain score from visit 1 to followup 1 in the treated group than in the sham treated group (mean +/- SEM 6.7 +/- 0.9 vs 3.0 +/- 1.4, $p = 0.0322$). There were 19 men in the treated group who were initially unable to achieve erections hard enough for penetration (Erection Hardness Score 2 or less) who were able to achieve erections sufficiently firm for penetration (Erection Hardness Score 3 or greater) after low intensity extracorporeal shock wave therapy, compared to none in the sham group. Physiologically penile hemodynamics significantly improved in the treated group but not in the sham group (maximal post-ischemic penile blood flow 8.2 vs 0.1 ml per minute per dl, $p <0.0001$). None of the men experienced discomfort or reported any adverse effects from the treatment.

CONCLUSIONS: This is the first randomized, double-blind, sham controlled study to our knowledge that shows that low intensity extracorporeal shock wave therapy has a positive short-term clinical and physiological effect on the erectile function of men who respond to oral phosphodiesterase type 5 inhibitor therapy. The feasibility and tolerability of this treatment, coupled with its potential rehabilitative characteristics, make it an attractive new therapeutic option for men with erectile dysfunction.

8.

Tadalafil once daily and extracorporeal shock wave therapy in the management of patients with Peyronie's disease and erectile dysfunction: results from a prospective randomized trial.

Palmieri A; Imbimbo C; Creta M; Verze P; Fusco F; Mirone V.

International Journal of Andrology. 35(2):190-5, 2012 Apr.
[Clinical Trial. Journal Article. Randomized Controlled Trial]
UI: 22085227

Extracorporeal shock wave therapy improves erectile function in patients with Peyronie's disease. However, erectile dysfunction still persists in many cases. We aimed to investigate the effects of extracorporeal shock wave therapy plus tadalafil 5 mg once daily in the management of patients with Peyronie's disease and erectile dysfunction not previously treated. One hundred patients were enrolled in a prospective, randomized, controlled study. Patients were randomly allocated to receive either extracorporeal shock wave therapy alone for 4 weeks (n = 50) or extracorporeal shock wave therapy plus tadalafil 5 mg once daily for 4 weeks (n = 50). Main outcome measures were: erectile function (evaluated through the shortened version of the International Index of Erectile Function), pain during erection (evaluated through a Visual Analog Scale), plaque size, penile curvature and quality of life (evaluated through an internal questionnaire). Follow-up evaluations were performed after 12 and 24 weeks. In both groups, at 12 weeks follow-up, mean Visual Analog Scale score, mean International Index of Erectile Function score and mean quality of life score ameliorated significantly while mean plaque size and mean curvature degree were unchanged. Intergroup analysis revealed a significantly higher mean International Index of Erectile Function score and quality of life score in patients receiving the combination. After 24 weeks, intergroup analysis revealed a significantly higher mean International Index of Erectile Function score and mean quality of life score in patients that received extracorporeal shock wave therapy plus tadalafil. In conclusion extracorporeal shock wave therapy plus tadalafil 5 mg once daily may represent a valid conservative strategy for the management of patients with Peyronie's disease and erectile dysfunction.

9.

Low-intensity extracorporeal shock wave therapy--a novel effective treatment for erectile dysfunction in severe ED patients who respond poorly to PDE5 inhibitor therapy.

Gruenwald I; Appel B; Vardi Y.

Journal of Sexual Medicine. 9(1):259-64, 2012 Jan.
[Clinical Trial. Journal Article]
UI: 22008059

INTRODUCTION: Low-intensity shock wave therapy (LI-ESWT) has been reported as an effective treatment in men with mild and moderate erectile dysfunction (ED).

AIM: The aim of this study is to determine the efficacy of LI-ESWT in severe ED patients who were poor responders to phosphodiesterase type 5 inhibitor (PDE5i) therapy.
METHODS: This was an open-label single-arm prospective study on ED patients with an erection hardness score (EHS) < 2 at baseline. The protocol comprised two treatment sessions per week for 3 weeks, which were repeated after a 3-week no-treatment interval. Patients were followed at 1 month (FU1), and only then an active PDE5i medication was provided for an additional month until final follow-up visit (FU2). At each treatment session, LI-ESWT was applied on the penile shaft and crus at five different anatomical sites (300 shocks, 0.09 mJ/mm(2) intensity at 120 shocks/min). Each subject underwent a full baseline assessment of erectile function using validated questionnaires and objective penile hemodynamic testing before and after LI-ESWT.
MAIN OUTCOME MEASURES: Outcome measures used are changes in the International Index of Erectile Function-erectile function domain (IIEF-ED) scores, the EHS measurement, and the three parameters of penile hemodynamics and endothelial function.
RESULTS: Twenty-nine men (mean age of 61.3) completed the study. Their mean IIEF-ED scores increased from 8.8 +/- 1 (baseline) to 12.3 +/- 1 at FU1 (P = 0.035). At FU2 (on active PDE5i treatment), their IIEF-ED further increased to 18.8 +/- 1 (P < 0.0001), and 72.4% (P < 0.0001) reached an EHS of > 3 (allowing full sexual intercourse). A significant improvement (P = 0.0001) in penile hemodynamics was detected after treatment and this improvement significantly correlated with increases in the IIEF-ED (P < 0.05). No noteworthy adverse events were reported.
CONCLUSIONS: Penile LI-ESWT is a new modality that has the potential to treat a subgroup of severe ED patients. These preliminary data need to be reconfirmed by multicenter sham control studies in a larger group of ED patients.

10.

Our experience on the association of a new physical and medical therapy in patients suffering from induratio penis plastica.

Mirone V; Imbimbo C; Palmieri A; Fusco F.
European Urology. 36(4):327-30, 1999 Oct.
[Clinical Trial. Journal Article]
UI: 10473993
OBJECTIVES: To check the efficiency of shock waves in the treatment of induratio penis plastica. The Minilith SL1, successfully used in orthopedic or salivary stones because of its lithotriptic power, can be used to break plaques in Peyronie's disease.
METHODS: A total of 130 patients affected with Peyronie's disease were entered into a prospective trial. Patients with completely calcified plaques as determined by ultrasound evaluation were excluded. We divided the patients into three treatment groups: (A) shock waves alone in 21 patients; (B) a combination of shock waves and verapamil (perilesional injection) in 36 patients, and (C) verapamil alone in 73 patients. First, we treated all groups A and B patients 3 times, 20 min each time, with a Minilith SL1, and then only the patients of the second group received a complete cycle of twelve injections of verapamil (10 mg) every 2 weeks for 6 months. The group of 73 patients (group C) treated during the previous 2 years with a medical therapy (only injection of verapamil) was used as a control group.
RESULTS: Ultrasound evaluation showed a reduction of plaque in 11/21 group A patients and 7/36 group B patients. The treatment was tolerated very well and only 11 petechiae in some patients were noticed after ESW treatment.

CONCLUSIONS: The therapeutic association of shock waves with verapamil injection is an effective nonoperative treatment for the stabilization of Peyronie's disease.

11.
Treatment of Peyronie's disease by extracorporeal shockwave therapy: evaluation of our preliminary results.
Abdel-Salam Y; Budair Z; Renner C; Frede T; Rassweiler J; El-Annany F; El-Magraby H; El-Akkad M.
Journal of Endourology. 13(8):549-52, 1999 Oct.
[Clinical Trial. Comparative Study. Journal Article]
UI: 10597123
BACKGROUND: Peyronie's disease is an idiopathic disorder of the penis that produces erectile dysfunction. It affects mainly the tunica albuginea. We describe our preliminary results with extracorporal shockwave therapy (ESWT) as a new noninvasive modality for the treatment of Peyronie's disease.
PATIENTS AND METHODS: In this study, 24 patients aged 36 to 67 years were treated with ESWT on the Lithostar overhead-module (Siemens). All our patients had unsuccessful medical treatment before ESWT. The average plaque was 7x15 mm. The number of shockwaves ranged from 15,000 to 25,000 (18-21 kV) delivered in four to ten sessions. Most patients needed local anesthesia before therapy.
RESULTS: Four patients (17%) showed marked improvement and complete remission of the penile deviation. Six patients (25%) showed partial remission with painless erections after treatment. Four patients had painless erections after treatment but still had some penile deviation. In 10 patients (41%), ESWT failed, necessitating subsequent penile surgery.
CONCLUSIONS: Our preliminary results with a response rate of 59% with ESWT for Peyronie's disease, including a 17% complete remission rate, is encouraging. However, further multicenter studies will have to prove if ESWT is a real therapeutic option for this disease.

12. World J Urol. 2016 Jul 22. [Epub ahead of print]

Is there a role for extracorporeal shock wave therapy for erectile dysfunction unresponsive to phosphodiesterase type 5 inhibitors?

Zou ZJ(1), Liu ZH(1), Tang LY(1), Lu YP(2).

DOI: 10.1007/s00345-016-1899-y
PMID: 27447990 [PubMed - as supplied by publisher]

13. Sex Med. 2016 Jul 18. pii: S2050-1161(16)30042-3. doi:10.1016/j.esxm.2016.06.001. [Epub ahead of print]

Twelve-Month Efficacy and Safety of Low-Intensity Shockwave Therapy for Erectile Dysfunction in Patients Who Do Not Respond to Phosphodiesterase Type 5 Inhibitors.

Bechara A(1), Casabé A(2), De Bonis W(2), Gomez Ciciclia P(2).

INTRODUCTION: Low-intensity shockwave therapy (LISWT) has recently emerged as a promising method in the treatment of erectile dysfunction (ED).
AIM: To assess the long-term results of the effectiveness and safety of LISWT in patients with ED who are non-responders to phosphodiesterase type 5 inhibitor (PDE5i) treatment.
METHODS: This open-label, longitudinal, and observational study investigated an uncontrolled population of 50 consecutive patients whose ED was unresponsive to PDE5i treatment. Patients were treated with a four-session LISWT protocol. During active treatment and follow-up, all patients remained on their regular high on-demand or once-daily PDE5i dosing schedules.
MAIN OUTCOME MEASURES: Effectiveness was assessed according to the International Index of Erectile Function erectile function domain, questions 2 and 3 of the Sexual Encounter Profile, Erection Hardness Scale, and Global Assessment Question scores at baseline and at 3, 6, 9, and 12 months after treatment. Patients were considered responders whenever they showed improvement in erection parameters in all four assessments and responded positively to the Global Assessment Question. Adverse events were recorded. Statistical variables were applied and findings were considered statistically significant at a P value less than < .05.
RESULTS: Eighty percent (mean age = 64.8 years) completed the 12-month follow-up. Positive response rates were 60% of available subjects at the end of the study and 48% of the intent-to-treat population. After the 12-month follow-up, 91.7% of responders maintained their responses. No patient reported treatment-related adverse events.
CONCLUSION: LISWT in patients with ED unresponsive to PDE5i treatment was effective and safe in 60% of patients treated. The efficacy response was maintained for 12 months in most patients.

DOI: 10.1016/j.esxm.2016.06.001
PMID: 27444215 [PubMed - as supplied by publisher]

14. Eur Urol. 2016 Jun 16. pii: S0302-2838(16)30259-7. doi:10.1016/j.eururo.2016.05.050. [Epub ahead of print]

Low-intensity Extracorporeal Shock Wave Treatment Improves Erectile Function: A Systematic Review and Meta-analysis.

Lu Z(1), Lin G(2), Reed-Maldonado A(2), Wang C(3), Lee YC(4), Lue TF(5).

CONTEXT: As a novel therapeutic method for erectile dysfunction (ED), low-intensity extracorporeal shock wave treatment (LI-ESWT) has been applied recently in the clinical setting. We feel that a summary of the current literature and a systematic review to evaluate the therapeutic efficacy of

LI-ESWT for ED would be helpful for physicians who are interested in using this modality to treat patients with ED.
OBJECTIVE: A systematic review of the evidence regarding LI-ESWT for patients with ED was undertaken with a meta-analysis to identify the efficacy of the treatment modality.
EVIDENCE ACQUISITION: A comprehensive search of the PubMed and Embase databases to November 2015 was performed. Studies reporting on patients with ED treated with LI-ESWT were included. The International Index of Erectile Function (IIEF) and the Erection Hardness Score (EHS) were the most commonly used tools to evaluate the therapeutic efficacy of LI-ESWT.
EVIDENCE SYNTHESIS: There were 14 studies including 833 patients from 2005 to 2015. Seven studies were randomized controlled trials (RCTs); however, in these studies, the setup parameters of LI-ESWT and the protocols of treatment were variable. The meta-analysis revealed that LI-ESWT could significantly improve IIEF (mean difference: 2.00; 95% confidence interval [CI], 0.99-3.00; p<0.0001) and EHS (risk difference: 0.16; 95% CI, 0.04-0.29; p=0.01). Therapeutic efficacy could last at least 3 mo. The patients with mild-moderate ED had better therapeutic efficacy after treatment than patients with more severe ED or comorbidities. Energy flux density, number of shock waves per treatment, and duration of LI-ESWT treatment were closely related to clinical outcome, especially regarding IIEF improvement.
CONCLUSIONS: The number of studies of LI-ESWT for ED have increased dramatically in recent years. Most of these studies presented encouraging results, regardless of variation in LI-ESWT setup parameters or treatment protocols. These studies suggest that LI-ESWT could significantly improve the IIEF and EHS of ED patients. The publication of robust evidence from additional RCTs and longer-term follow-up would provide more confidence regarding use of LI-ESWT for ED patients.
PATIENT SUMMARY: We reviewed 14 studies of men who received low-intensity extracorporeal shock wave treatment (LI-ESWT) for erectile dysfunction (ED). There was evidence that these men experienced improvements in their ED following LI-ESWT.

DOI: 10.1016/j.eururo.2016.05.050
PMID: 27321373 [PubMed - as supplied by publisher]

15. Int J Urol. 2016 Jan;23(1):80-4. doi: 10.1111/iju.12955. Epub 2015 Oct 26.

Impact of aging and comorbidity on the efficacy of low-intensity shock wave therapy for erectile dysfunction.

Hisasue S(1), China T(1), Horiuchi A(2), Kimura M(2), Saito K(2), Isotani S(2), Ide H(2), Muto S(2), Yamaguchi R(2), Horie S(1,)(2).

OBJECTIVES: To evaluate the efficacy of low-intensity shock wave therapy and to

identify the predictive factors of its efficacy in Japanese patients with erectile dysfunction.
METHODS: The present study included 57 patients with erectile dysfunction who satisfied all the following conditions: more than 6-months history of erectile dysfunction, sexual health inventory for men score of ≤ 12 without phosphodiesterase type-5 inhibitor, erection hardness score grade 1 or 2, mean penile circumferential change by erectometer assessing sleep related erection of < 25 mm and non-neurological pathology. Patients were treated by a low-energy shock waves generator (ED1000; Medispec, Gaithersburg, MD, USA). A total of 12 shock wave treatments were applied. Sexual health inventory for men score, erection hardness score with or without phosphodiesterase type-5 inhibitor, and mean penile circumferential change were assessed at baseline, 1, 3 and 6 months after the termination of low-intensity shock wave therapy.
RESULTS: Of 57 patients who were assigned for the low-intensity shock wave therapy trial, 56 patients were analyzed. Patients had a median age of 64 years. The sexual health inventory for men and erection hardness score (with and without phosphodiesterase type-5 inhibitor) were significantly increased ($P < 0.001$) at each time-point. The mean penile circumferential change was also increased from 13.1 to 20.2 mm after low-intensity shock wave therapy ($P < 0.001$). In the multivariate analysis, age and the number of concomitant comorbidities were statistically significant predictors for the efficacy.
CONCLUSIONS: Low-intensity shock wave therapy seems to be an effective physical therapy for erectile dysfunction. Age and comorbidities are negative predictive factors of therapeutic response.

DOI: 10.1111/iju.12955
PMID: 26501992 [PubMed - in process]

16. Can J Urol. 2015 Feb;22(1):7614-22.

Low intensity extracorporeal shockwave therapy for erectile dysfunction: a study in an Indian population.

Srini VS(1), Reddy RK, Shultz T, Denes B.

INTRODUCTION: Erectile dysfunction (ED) has been shown to be associated with a number of physical conditions and affects not only physical but also psychosocial health. Currently oral, on-demand phosphodiesterase type 5 inhibitors (PDE5i) are preferred first line treatment. Though effective, these drugs have limitations and are associated with significant non-compliance, side effects and do not reverse the underlying pathology. Non-invasive low intensity shockwave therapy (LISWT) has been shown to significantly improve erectile function in men previously PDE5i dependent. We describe our experience and results with this therapy in an Indian population of men with ED. This study assessed the efficacy of low intensity extracorporeal shockwave therapy (LI-ESWT) on Indian men with

organic ED who had previously responded to PDE5i.
MATERIALS AND METHODS: All the patients underwent a 1 month PDE5i washout period. Men were randomized to receive either 12 sessions of LI-ESWT (n = 95) or placebo/sham therapy (n = 40). Before the first treatment, erectile function and penile hemodynamics were assessed to substantiate a vascular etiology for the ED. Outcomes were assessed using Erection Hardness Score (EHS), International Index of Erectile Function-Erectile Function Domain (IIEF-EF domain) and Clinical Global Impression of Change (CGIC) scores at 1, 3, 6, 9 and 12 months post-treatment.
RESULTS: We found a significant increase in the EHS and IIEF-EF Domain scores from visit 1 to follow up 5 (12 months) in the treated group compared to the placebo group. By 1 month after treatment there were highly significant differences between the LI-ESWT and placebo groups ($p < 0.0001$). Out of 60 men in the LI-ESWT group who completed the study, 47 (78%) men at FU1 and 43 (71%) at FU5 who were initially unable to achieve spontaneous erections hard enough for penetration (EHS ≤ 2) were able to do so (EHS ≥ 3) compared to none in the placebo group. The treatment was well tolerated and none of the men experienced treatment related discomfort or reported any adverse effects from the treatment.
CONCLUSIONS: In this double-blind, placebo-controlled study, LI-ESWT demonstrated a positive long term clinical effect with improvement in erectile function of Indian men with vasculogenic ED who were prior responders to PDE5i therapy. The efficacy and tolerability of this treatment, coupled with its long term benefits and rehabilitative characteristics, make it an attractive new therapeutic option for men with vasculogenic erectile dysfunction.

PMID: 25694008 [PubMed - indexed for MEDLINE]

17. World J Mens Health. 2013 Dec;31(3):208-14. doi: 10.5534/wjmh.2013.31.3.208. Epub 2013 Dec 24.

Low-intensity shock wave therapy and its application to erectile dysfunction.

Lei H(1), Liu J(1), Li H(1), Wang L(1), Xu Y(1), Tian W(2), Lin G(3), Xin Z(1).

Although phosphodiesterase type 5 inhibitors (PDE5Is) are a revolution in the treatment of erectile dysfunction (ED) and have been marketed since 1998, they cannot restore pathological changes in the penis. Low-energy shock wave therapy (LESWT) has been developed for treating ED, and clinical studies have shown that LESWT has the potential to affect PDE5I non-responders with ED with few adverse effects. Animal studies have shown that LESWT significantly improves penile hemodynamics and restores pathological changes in the penis of diabetic ED animal models. Although the mechanisms remain to be investigated, recent studies have reported that LESWT could partially restore corpus cavernosum fibromuscular pathological changes, endothelial dysfunction, and peripheral neuropathy. LESWT could be a novel modality for treating ED, and particularly PDE5I non-responders with organic ED, in the near future. However, further extensive evidence-based

basic and clinical studies are needed. This review intends to summarize the scientific background underlying the effect of LESWT on ED.

DOI: 10.5534/wjmh.2013.31.3.208
PMCID: PMC3888889
PMID: 24459653 [PubMed]

18. Ther Adv Urol. 2013 Apr;5(2):95-9. doi: 10.1177/1756287212470696.

Shockwave treatment of erectile dysfunction.

Gruenwald I(1), Appel B, Kitrey ND, Vardi Y.

Low-intensity extracorporeal shock wave therapy (LI-ESWT) is a novel modality that has recently been developed for treating erectile dysfunction (ED). Unlike other current treatment options for ED, all of which are palliative in nature, LI-ESWT is unique in that it aims to restore the erectile mechanism in order to enable natural or spontaneous erections. Results from basic science experiments have provided evidence that LI-ESWT induces cellular microtrauma, which in turn stimulates the release of angiogenic factors and the subsequent neovascularization of the treated tissue. Extracorporeal shock wave therapy (ESWT) has been clinically investigated and applied in several medical fields with various degrees of success. High-intensity shock wave therapy is used for lithotripsy because of its focused mechanical destructive nature, and medium-intensity shock waves have been shown to have anti-inflammatory properties and are used for treating a wide array of orthopedic conditions, such as non-union fractures, tendonitis, and bursitis. In contrast, LI-ESWT has angiogenetic properties and is therefore used in the management of chronic wounds, peripheral neuropathy, and in cardiac neovascularization. As a result of these characteristics we initiated a series of experiments evaluating the effect of LI-ESWT on the cavernosal tissue of patients with vasculogenic ED. The results of our studies, which also included a double-blind randomized control trial, confirm that LI-ESWT generates a significant clinical improvement of erectile function and a significant improvement in penile hemodynamics without any adverse effects. Although further extensive research is needed, LI-ESWT may create a new standard of care for men with vasculogenic ED.

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19.
Initial experience with linear focused shockwave treatment for erectile dysfunction: A 6-month follow-up pilot study.
Reisman Y., Hind A., Varaneckas A., Motil I.
International Journal of Impotence Research. 27 (3) (pp 108-112), 2014. Date of Publication: 2014.

AN: 600737331
Low-intensity shockwaves (LISW) are known to produce revascularization and have been in evaluation and in use to treat erectile dysfunction (ED). The present single-arm pilot study is aimed to assess the safety and efficacy of a dedicated shockwave device (Renova) on vasculogenic ED patients. Fifty-eight patients with mild to severe ED were treated by LISW and their erectile function was evaluated by the International Index of Erectile Function-Erectile Function Domain (IIEF-EF), Sexual Encounter Profile and Global Assessment Questions questionnaires, at baseline and at 1, 3 and 6 months post treatment. The average IIEF-EF increased significantly from 14.78 at baseline to 21.93 at 3 months post treatment and stabilized at 22.26 at 6 months post treatment. Out of 58 patients, 47 (81%) had a successful treatment. No adverse events were reported during the treatment and the follow-up duration. In conclusion, it suggests that the performance of LISW could add a new advanced treatment for ED. Copyright © 2014 Macmillan Publishers Limited.
PMID
25471316 [http://www.ncbi.nlm.nih.gov/pubmed/?term=25471316]

20.
Pro: Does shockwave therapy have a place in the treatment of Peyronie's disease?.
Chung E.
Translational Andrology and Urology. 5 (3) (pp 366-370), 2016. Date of Publication: 01 Jun 2016.
AN: 610767221

21.
Therapeutic advances in the treatment of Peyronie's disease.
Yafi F.A., Pinsky M.R., Sangkum P., Hellstrom W.J.G.
Andrology. 3 (4) (pp 650-660), 2015. Date of Publication: 01 Jul 2015.
AN: 604955887
Peyronie's disease (PD) is an under-diagnosed condition with prevalence in the male population as high as 9%. It is a localized connective tissue disorder of the penis characterized by scarring of the tunica albuginea. Its pathophysiology, however, remains incompletely elucidated. For the management of the acute phase of PD, there are currently numerous available oral drugs, but the scientific evidence for their use is weak. In terms of intralesional injections, collagenase clostridium histolyticum is currently the only Food and Drug Administration-approved drug for the management of patients with PD and a palpable plaque with dorsal or dorsolateral curvature >30degree. Other available intralesional injectable drugs include verapamil and interferon-alpha-2B, however, their use is considered off-label. Iontophoresis, shockwave therapy, and radiation therapy have also been described with unconvincing results, and as such, their use is currently not recommended. Traction therapy, as part of a multimodal approach, is an underused additional tool for the prevention of PD-associated loss of penile length, but its efficacy is dependent on patient compliance. Surgical therapy remains the gold standard for patients in the chronic phase of the disease. In patients with adequate erectile function, tunical plication and/or incision/partial excision and grafting can be offered, depending on degree of curvature and/or presence of destabilizing deformity. In patients with erectile dysfunction non-responsive to oral therapy, insertion of an inflatable penile prosthesis with or without straightening procedures should be offered. Copyright © 2015 American Society of Andrology and European Academy of Andrology.

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26097120 [http://www.ncbi.nlm.nih.gov/pubmed/?term=26097120]

22.
Penile low intensity shock wave treatment is able to shift PDE5i nonresponders to responders: A double-blind, sham controlled study.
Kitrey N.D., Gruenwald I., Appel B., Shechter A., Massarwa O., Vardi Y.
Journal of Urology. 195 (5) (pp 1550-1555), 2016. Date of Publication: 01 May 2016.
AN: 609362599
Purpose We performed sham controlled evaluation of penile low intensity shock wave treatment effect in patients unable to achieve sexual intercourse using PDE5i (phosphodiesterase type 5 inhibitor). Materials and Methods This prospective, randomized, double-blind, sham controlled study was done in patients with vasculogenic erectile dysfunction who stopped using PDE5i due to no efficacy. All patients had an erection hardness score of 2 or less with PDE5i. A total of 58 patients were randomized, including 37 treated with low intensity shock waves (12 sessions of 1,500 pulses of 0.09 mJ/mm2 at 120 shock waves per minute) and 18 treated with a sham probe. In the sham group 16 patients underwent low intensity shock wave treatment 1 month after sham treatment. All patients were evaluated at baseline and 1 month after the end of treatment using validated erectile dysfunction questionnaires and the flow mediated dilatation technique for penile endothelial function. Erectile function was evaluated while patients were receiving PDE5i. Results In the low intensity shock wave treatment group and the sham group 54.1% and 0% of patients, respectively, achieved erection hard enough for vaginal penetration, that is an EHS (Erection Hardness Score) of 3 ($p < 0.0001$). According to changes in the IIEF-EF (International Index of Erectile Function-Erectile Function) score treatment was effective in 40.5% of men who received low intensity shock wave treatment but in none in the sham group ($p = 0.001$). Of patients treated with shock waves after sham treatment 56.3% achieved erection hard enough for penetration ($p < 0.005$). Conclusions Low intensity shock wave treatment is effective even in patients with severe erectile dysfunction who are PDE5i nonresponders. After treatment about half of them were able to achieve erection hard enough for penetration with PDE5i. Longer followup is needed to establish the place of low intensity shock wave treatment in these challenging cases.

23.
Low-intensity extracorporeal shockwave therapy in the treatment of postprostatectomy erectile dysfunction: A pilot study.
Frey A., Sonksen J., Fode M.
Scandinavian Journal of Urology. 50 (2) (pp 123-127), 2016. Date of Publication: 03 Mar 2016.
AN: 606614282
Objective: The objective was to investigate the effect and feasibility of low-intensity extracorporeal shockwave therapy (LI-ESWT) as a treatment for erectile dysfunction (ED) after bilateral nerve-sparing radical prostatectomy (RP). Materials and methods: Patients who had undergone robot-assisted bilateral nerve-sparing RP more than a year before entering this pilot study, had no preoperative ED and were suffering from mild to severe postoperative ED were invited to participate. Six treatments were given over a 6 week period, using the Duolith SD1 T-Top machine. The effect of the treatment was evaluated 1 month (t1) and 1 year (t2) after the

final treatment. The main outcome measure was changes in the five-item International Index of Erectile Function (IIEF-5) scores. Results: Eighteen patients were included in the study. However, two patients breached the protocol and consequently 16 patients were included in the analysis at t1 and 15 patients were included in the analysis at t2. At baseline the median age was 62 years (range 51 to 70 years) and the median time since surgery was 24 months (range 12 to 54 months). The median preoperative IIEF-5 score was 25 (range 22 to 25) and the median baseline IIEF-5 score was 9.5 (range 5 to 20). The median change in IIEF-5 scores was +3.5 (range-1 to 8; p = 0.0049) and +1 (range-3 to 14; p = 0.046) at t1 and t2, respectively. No severe side-effects were reported. Conclusions: LI-ESWT may improve erectile function after bilateral nerve-sparing RP. Based on these results, further studies in patients with ED after nerve-sparing RP are justified. Copyright © 2016 Taylor & Francis.

24.
Shock treatment for erectile dysfunction.
Stone L.
Nature Reviews Urology. 12 (2) (pp 62), 2015. Date of Publication: 01 Jan 2015.
AN: 601088476
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25534999 [http://www.ncbi.nlm.nih.gov/pubmed/?term=25534999]

25.
Peyronie's disease and low intensity shock wave therapy: Clinical outcomes and patient satisfaction rate in an open-label single arm prospective study in Australian men.
Chung E.
Korean Journal of Urology. 56 (11) (pp 770-780), 2015. Date of Publication: November 2015.
AN: 606937232
Purpose: To evaluate the efficacy, safety and patient satisfaction outcomes following low intensity extracorporeal shock wave therapy (LiESWT) in men with Peyronie's disease (PD) using a standardised protocol. Materials and Methods: In this open-label single arm prospective study, patients with PD were enrolled following informed consent. Patient demographics, change in penile curvature and plaque hardness, International Index of Erectile Function (IIEF)-5 score, and overall satisfaction score (on a 5-point scale) were recorded. Treatment template consists of 3000 shock waves to the Peyronie's plaque over 20 minutes, twice weekly for 6 weeks. Results: The majority of patients have PD history longer than 6 months (mean, 12.8 months; range, 6-28 months). Two thirds of patients have received and failed oral medical therapy. There were improvements in penile curvature (more than 15 degrees in 33% of men), plaque hardness (60% of men) and penile pain (4 out of 6 men) following LiESWT. There was a moderate improvement in IIEF-5 score (>5 points reported in 20% of men). No complication was reported and the majority of patients were satisfied (rated 4 out of 5; 70% of men) and would recommend this therapy to others. Conclusions: In a carefully selected group of men with PD, LiESWT appears to be safe, has moderate efficacy and is associated with high patient satisfaction rate in the short term. Copyright © The Korean Urological Association, 2015.

26.

Penile low-intensity shock wave therapy: A promising novel modality for erectile dysfunction.
Abu-Ghanem Y., Kitrey N.D., Gruenwald I., Appel B., Vardi Y.
Korean Journal of Urology. 55 (5) (pp 295-299), 2014. Date of Publication: MAY 2014.
AN: 373127446
Penile extracorporeal low-intensity shock wave therapy (LIST) to the penis has recently emerged as a novel and promising modality in the treatment of erectile dysfunction (ED). LIST has angiogenic properties and stimulates neovascularization. If applied to the corpora cavernosa, LIST can improve penile blood flow and endothelial function. In a series of clinical trials, including randomized double-blind sham-controlled studies, LIST has been shown to have a substantial effect on penile hemodynamics and erectile function in patients with vasculogenic ED. LIST is effective in patients who are responsive to phosphodiesterase 5 inhibitors (PDE5i) and can also convert PDE5i nonresponders to responders. The response to LIST wanes gradually over time, and after 2 years, about half of the patients maintain their function. Extensive research is needed to understand the effect of LIST on erectile tissue, to modify the treatment protocol to maximize its outcomes, and to identify the patients who will benefit the most from this treatment. © The Korean Urological Association, 2014.

27.
Low-intensity extracorporeal shock wave therapy in vascular disease and erectile dysfunction: Theory and outcomes.
Gruenwald I., Kitrey N.D., Appel B., Vardi Y.
Sexual Medicine Reviews. 1 (2) (pp 83-90), 2013. Date of Publication: 2013.
AN: 373330906
Introduction: Low-intensity extracorporeal shock wave therapy (LI-ESWT) to the penis has recently emerged as a new and promising modality in the treatment of erectile dysfunction (ED). Aim: To review the published literature on the mechanism of action of LI-ESWT; and to report our clinical data on its efficacy in men with vasculogenic ED. Methods: A Medline search using the relevant keywords on this topic has been done. Results: From the results of numerous preclinical and animal studies that have been done to date, sufficient evidence shows that the underlying mechanism of action of LI-ESWT is probably neovascularization. Therefore, local application of LI-ESWT to the corpora cavernosa may potentially act in the same mechanism and increase corporal blood flow. We found that the application of LI-ESWT to patients who responded to oral therapy (PDE5i) eliminated their dependence on PDE5i and they were able to successfully achieve erections and vaginal penetration (60-75%). Furthermore, PDE5i non-responders became responders and capable of vaginal penetration (72%). Additionally, LI-ESWT resulted in long-term improvement of the erectile mechanism. Conclusions: LI-ESWT has the potential to improve and permanently restore erectile function by reinstating the penile blood flow. Although these results on LI-ESWT are promising, further multi- centered studies with longer follow-up are needed to confirm these findings. Gruenwald I, Kitrey ND, Appel B, and Vardi Y. Stem low-intensity extracorporeal shock wave therapy in vascular disease and erectile dysfunction: Theory and outcomes. Sex Med Rev 2013;1:83-90. © 2013 International Society for Sexual Medicine.

28.
Can low-intensity extracorporeal shockwave therapy improve erectile function? A 6-month follow-up pilot study in patients with organic erectile dysfunction.
Vardi Y., Appel B., Jacob G., Massarwi O., Gruenwald I.
European Urology. 58 (2) (pp 243-248), 2010. Date of Publication: August 2010.
AN: 50900781
Background: Low-intensity extracorporeal shockwave therapy (LI-ESWT) is currently under investigation regarding its ability to promote neovascularization in different organs. Objective: To evaluate the effect of LI-ESWT on men with erectile dysfunction (ED) who have previously responded to oral phosphodiesterase type 5 inhibitors (PDE5-I). Design, setting, and participants: We screened 20 men with vasculogenic ED who had International Index of Erectile Function ED (IIEF-ED) domain scores between 5-19 (average: 13.5) and abnormal nocturnal penile tumescence (NPT) parameters. Shockwave therapy comprised two treatment sessions per week for 3 wk, which were repeated after a 3-wk no-treatment interval. Intervention: LI-ESWT was applied to the penile shaft and crura at five different sites. Measurements: Assessment of erectile function was performed at screening and at 1 mo after the end of the two treatment sessions using validated sexual function questionnaires, NPT parameters, and penile and systemic endothelial function testing. The IIEF-ED questionnaire was answered at the 3- and 6-mo follow-up examinations. Results and limitations: We treated 20 middle-aged men (average age: 56.1 yr) with vasculogenic ED (mean duration: 34.7 mo). Eighteen had cardiovascular risk factors. At 1 mo follow-up, significant increases in IIEF-ED domain scores were recorded in all men (20.9 +/- 5.8 vs 13.5 +/- 4.1, $p < 0.001$); these remained unchanged at 6 mo. Moreover, significant increases in the duration of erection and penile rigidity, and significant improvement in penile endothelial function were demonstrated. Ten men did not require any PDE5-I therapy after 6-mo follow-up. No pain was reported from the treatment and no adverse events were noted during follow-up. Conclusions: This is the first study that assessed the efficacy of LI-ESWT for ED. This approach was tolerable and effective, suggesting a physiologic impact on cavernosal hemodynamics. Its main advantages are the potential to improve erectile function and to contribute to penile rehabilitation without pharmacotherapy. The short-term results are promising, yet demand further evaluation with larger sham-control cohorts and longer follow-up. © 2010 European Association of Urology.
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20451317 [http://www.ncbi.nlm.nih.gov/pubmed/?term=20451317]

29.
Shockwave therapy as first-line treatment for Peyronie's disease: A prospective study.
Skolarikos A., Alargof E., Rigas A., Deliveliotis Ch., Konstantinidis E.
Journal of Endourology. 19 (1) (pp 11-14), 2005. Date of Publication: January/February 2005.
AN: 40365736
Background and Purpose: To assess in a prospective study whether shockwave therapy (SWT) is effective as a first-line treatment for Peyronie's disease. Patients and Methods: Forty patients with previously untreated Peyronie's disease underwent SWT with the Epos overhead-module device (Dornier). The pain severity (visual analog pain scale [VAS] 0-5), the degree of penile angulation after vasoactive drug injection, plaque size by ultrasound measurement, and erectile dysfunction (IIEF score) were assessed prior to and after treatment. Of the 40 patients, 7 underwent two sessions and the rest three sessions. The time interval between treatments was 2 weeks. At a power level of 2 to 5 (mean 4), a maximum of 3000 shockwaves per plaque per

treatment were applied. The mean follow-up was 12 months. Results: All patients completed the protocol. The tolerance and safety were excellent. Of the 25 patients with pain on erection, 12 (48%) noticed relief after the first session, while 9 more were pain free at the end of the treatment (VAS reduction 2.8; P < 0.0001, and 2; P < 0.001, respectively). For 25 patients (62.5%), an improvement in penile angulation >20degree was observed, with a mean reduction of 35degree (range 20degree-60degree) (P < 0.001). No significant change in plaque size was noted. Among 28 patients with erectile dysfunction, 18 (64.2%) had a marked increase in erection quality (IIEF score change: +4 for 10 patients, +6 for 4 patients, +8 for 2 patients, +9 for 2 patients). Conclusion: Our results support SWT as an effective and safe first-line treatment for Peyronie's disease. © Mary Ann Liebert, Inc.
PMID
15735375 [http://www.ncbi.nlm.nih.gov/pubmed/?term=15735375]

30.
Extracorporeal shock wave therapy as an alternative treatment for Peyronie's disease.
de Almeida Claro J., Passerotti C.C., Figueiredo Neto A.C., Nardozza Jr. A., Ortiz V., Srougi M.
American Journal of Urology Review. 3 (8) (pp 390+393), 2005. Date of Publication: August 2005.
AN: 41645106

31.
Extracorporeal shock wave treatment for Peyronie's disease using EDAP LT-02; preliminary results.
Kiyota H., Ohishi Y., Asano K., Hasegawa N., Madarame J., Miki K., Kato N., Kimura T., Ishiyama T., Maeda S., Shimomura T., Shiono Y., Miki J.
International Journal of Urology. 9 (2) (pp 110-113), 2002. Date of Publication: 2002.
AN: 34299180
Background: Peyronie's disease is an idiopathic fibrosis of the tunica albuginea of the penis, which often causes erectile dysfunction. No effective therapy except surgery has been available for Peyronie's disease. We investigated the clinical efficacy of extracorporeal shock wave treatment (ESWT) using EDAP LT-02 as an alternative method of treatment for Peyronie's disease. Methods: Five patients aged 35-65 years were treated by ESWT. All patients had undergone unsuccessful medical treatment before ESWT. Each patient was treated by ESWT (7-40 storages at an energy density of 45-96 MPa) between three and five times at 4-week intervals. Although no patient needed anesthesia, all were administered diclofenac suppository (50 mg) before ESWT. Results: Of the five patients, four were eligible for evaluation. The penile plaque disappeared in one patient (25%). In the other three patients (75%), the penile plaque did not disappear, but softened. Although no improvement of erectile penile curvature was recognized, erectile penile pain disappeared in all patients. Conclusions: These results indicate that ESWT is a possible alternative to surgery in the treatment of Peyronie's disease.
PMID
12033197 [http://www.ncbi.nlm.nih.gov/pubmed/?term=12033197]
Institution

32.
Extracorporeal shock wave therapy in the treatment of Peyronie's disease: Experience with standard lithotriptor (siemens-multiline).
Lebret T., Loison G., Herve J.-M., Mc Eleny K.R., Lugagne P.-M., Yonneau L., Orsoni J.-L., Saporta F., Butreau M., Botto H.
Urology. 59 (5) (pp 657-661), 2002. Date of Publication: 2002.
AN: 34461972
Objectives. To assess in a prospective study whether extracorporeal shock wave therapy (ESWT) using a standard radioscopic location lithotriptor is effective in the treatment of Peyronie's disease. Methods. Fifty-four patients were included in this prospective study. Before and after treatment, the angulation was calculated by auto-photography. Pain severity was assessed by a visual analog pain scale. A self-evaluation questionnaire (International Index of Erectile Function) was used. All patients had symptoms (35 had pain during erection and 51 angulation greater than 20degree). The mean disease duration was 16 months. The mean angulation before treatment was 48degree (range 10degree to 100degree). Twenty-four patients had erectile dysfunction (questionnaire score less than 18). The Multiline Siemens lithotriptor was used. The plaque was located by palpation, and 1 mL of contrast agent was injected. Scopic visualization was used. Each patient received a minimum of one session of ESWT (3000 shock waves, 7 kJ) applied to a flaccid penis. Results. All patients completed the protocol. The tolerance and safety were excellent. Of the 35 patients with pain on erection, 31 (91%) noticed relief immediately after ESWT (mean reduction 2.9 on the visual analog pain scale) (P <0.00001). For 29 patients (53.7%), an improvement in angulation (greater than 10degree) was observed, with a mean reduction of 31degree (P <0.001). For patients with erectile dysfunction, only 6 (25%) had an increased questionnaire score (greater than 4). Twenty-five patients thought the plaque was smoother. Conclusions. ESWT with a standard lithotriptor (without the mobile arm) in Peyronie's disease is a feasible, safe, and effective treatment for pain on erection and significantly improves the penile angle. © 2002, Elsevier Science Inc.
PMID
11992835 [http://www.ncbi.nlm.nih.gov/pubmed/?term=11992835]

33.
Peyronie's disease - The plymouth experience of extracorporeal shockwave treatment.
Hamm R., Mclarty E., Ashdown J., Natale S., Dickinson A.
BJU International. 87 (9) (pp 849-852), 2001. Date of Publication: 2001.
AN: 34204328
Objective: To describe our experience of the use of extracorporeal shockwave treatment (EST) for Peyronie's disease. Patients and methods: The study included 28 patients (mean age 57 years, range 34-72) with stable Peyronie's disease who were treated with 3.9 (3-5) sessions of EST to the Peyronie's plaque. The patients' erectile function, pain and penile angle were assessed before and after treatment with EST. Results of the 28 patients, 20 felt that their erection improved after the procedure; 11 patients were able to recommence sexual intercourse and the index of erectile function increased in all but one patient. Conclusion: EST produces a significant improvement in pain and penile angle, with no serious complications.
PMID
11412225 [http://www.ncbi.nlm.nih.gov/pubmed/?term=11412225]