

The background of the slide is a light gray gradient with several realistic water droplets of various sizes scattered across it. The droplets have highlights and shadows, giving them a three-dimensional appearance.

NON-UNION FRACTURE CASE

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ÅRSMØDE ODENSE SEPTEMBER 2020

NON-UNION FRACTURES.

MY MOTIVATION FOR TREATING NON-UNION FRACTURES

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Journal of Orthopaedic
Surgery and Research

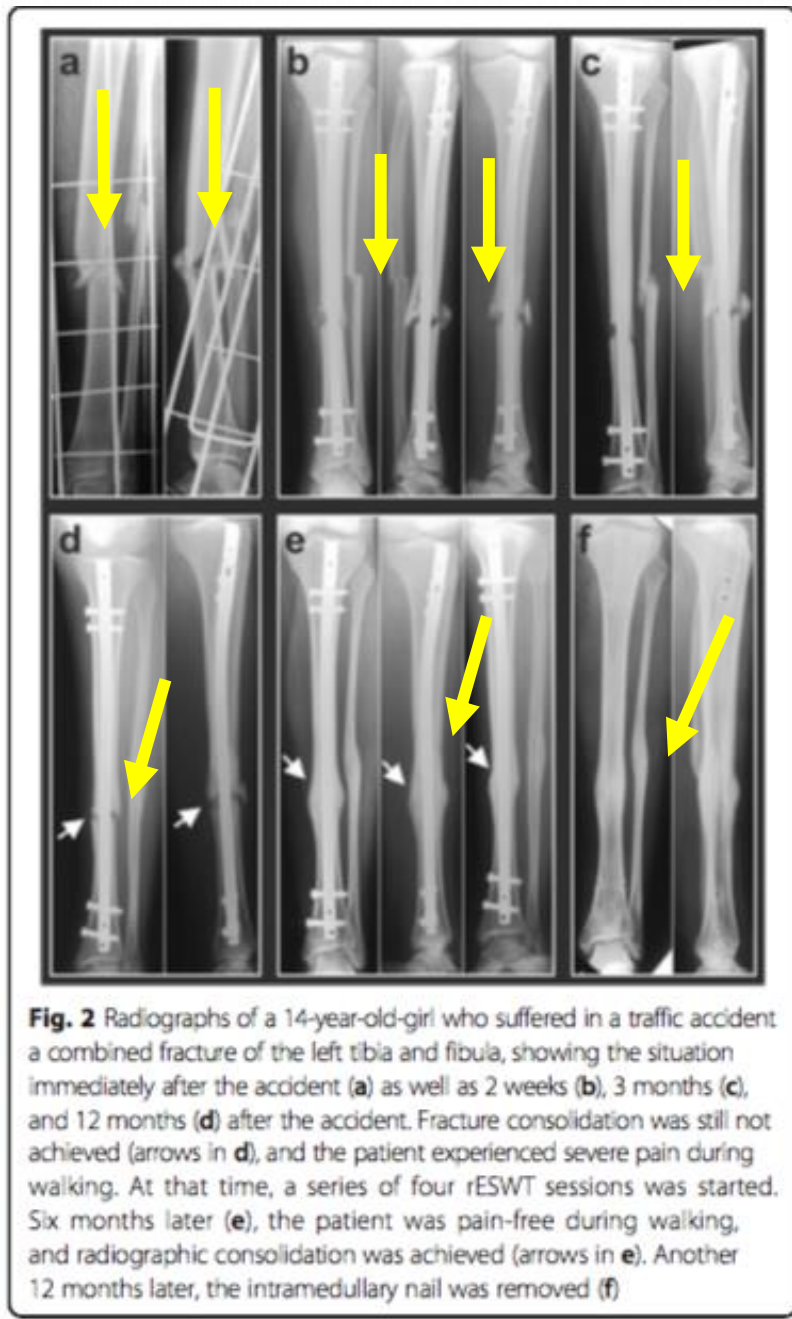
RESEARCH ARTICLE

Open Access

Radial extracorporeal shock wave therapy is efficient and safe in the treatment of fracture nonunions of superficial bones: a retrospective case series



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Car accident: 14 yr old girl
Fracture tibia + fibula

- a) Post accident
- b) 2 weeks after
- c) 12 months after
- d) 4 treatments rESWT
- e) Pain free and union after 6 months
- f) 12 months after rESWT osteosynthesis materials removed



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Review

Extracorporeal shockwave therapy (ESWT) – First choice treatment of fracture non-unions?



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- AROUND 75% OF REFERRED PATIENTS SUFFERING FROM A NON- UNION FRACTURE ARE SUITABLE FOR ESWT.
- CLEAR ADVANTAGE FOR THE PATIENT NOT UNDERGOING MAJOR SURGERY WITH THE ASSOCIATED RISKS AND COMPLICATIONS
- SAVINGS OF AROUND 65 - 85% (DEPENDING ON DIFFERENT ASSURANCE MODALITIES) ARE ACHIEVED IN AUSTRIA TREATING NON-UNION FRACTURES WITH ESWT IN PLACE OF SURGERY. (THIS FIGURE MAY BE CONSIDERABLY LARGER IF TREATED IN THE PRIMARY SECTOR – SEE LATER)
- **DOSAGE?** ALONG, THE PATIENTS' AGE, COMORBIDITIES SUCH AS DIABETES OR OSTEOPOROSIS, USE OF CORTICOSTEROIDS, METABOLIC DISORDERS, SMOKING OR ALCOHOL HAVE A STRONG INFLUENCE ON BONE HEALING. DUE TO THIS FACT IT IS ALMOST IMPOSSIBLE TO CREATE TWO COMPARABLE COHORTS OF PATIENTS SUFFERING FROM NON-UNIONS IN APPROXIMATELY THE SAME ANATOMICAL REGION WITH SIMILAR PREVIOUS SURGICAL PROCEDURES TO EVALUATE DIFFERENT TREATMENT OPTIONS FOR STUDY PURPOSES.

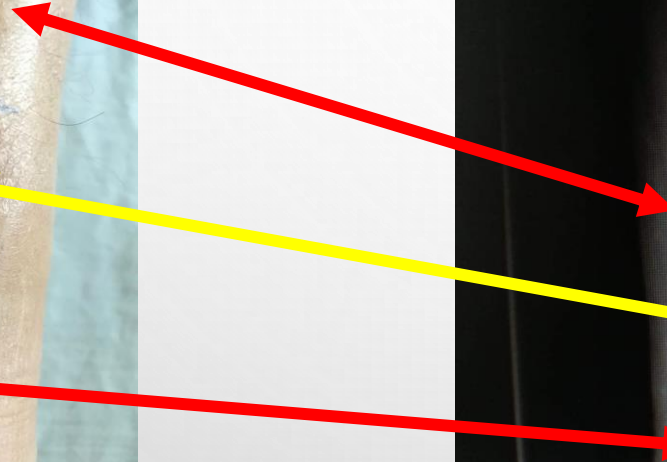
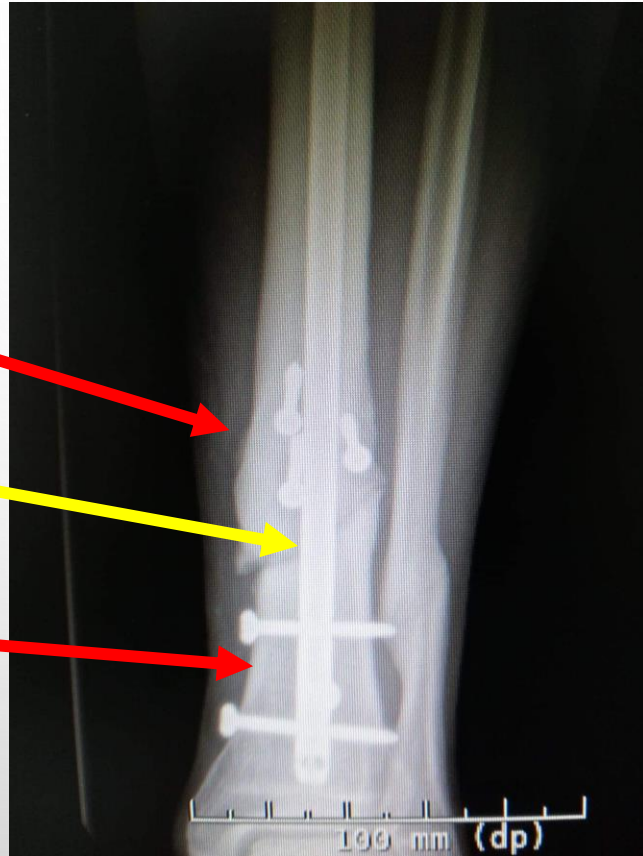
- THE CURRENT PEER-REVIEWED LITERATURE CLEARLY SHOWS THAT TREATMENT OF FRACTURE NON-UNIONS WITH ELECTROHYDRAULIC AND ELECTRO- MAGNETIC SHOCKWAVE SOURCES POSSESSING WIDE FOCUSSES (BIG DEVICES) DELIVERING HIGH ENERGY FLUX DENSITIES IS EFFECTIVE.
- AS THESE DEVICES ARE USED AT HIGH ENERGY LEVELS FOR NON-UNION TREATMENTS USUALLY SEDATION OR GENERAL- OR REGIONAL ANESTHESIA IS REQUIRED (NO – SEE LATER)
- ELECTROHYDRAULIC SYSTEMS ARE USED IN A SINGLE SESSION WHEREAS ELECTROMAGNETIC DEVICES ARE RECOMMENDED TO BE APPLIED FROM TWO TO FOUR SESSIONS
- TO BE SUITABLE FOR ESWT THE NON-UNION SHOULD BE IN CORRECT ANATOMICAL POSITION.
- A NON-UNION GAP OF BEING LARGER THAN 5 MM IN LONG BONES AS A NEGATIVE PREDICTOR FOR OUTCOME, THUS SURGICAL OPTIONS SHOULD BE CONSIDERED IN THESE CASES.

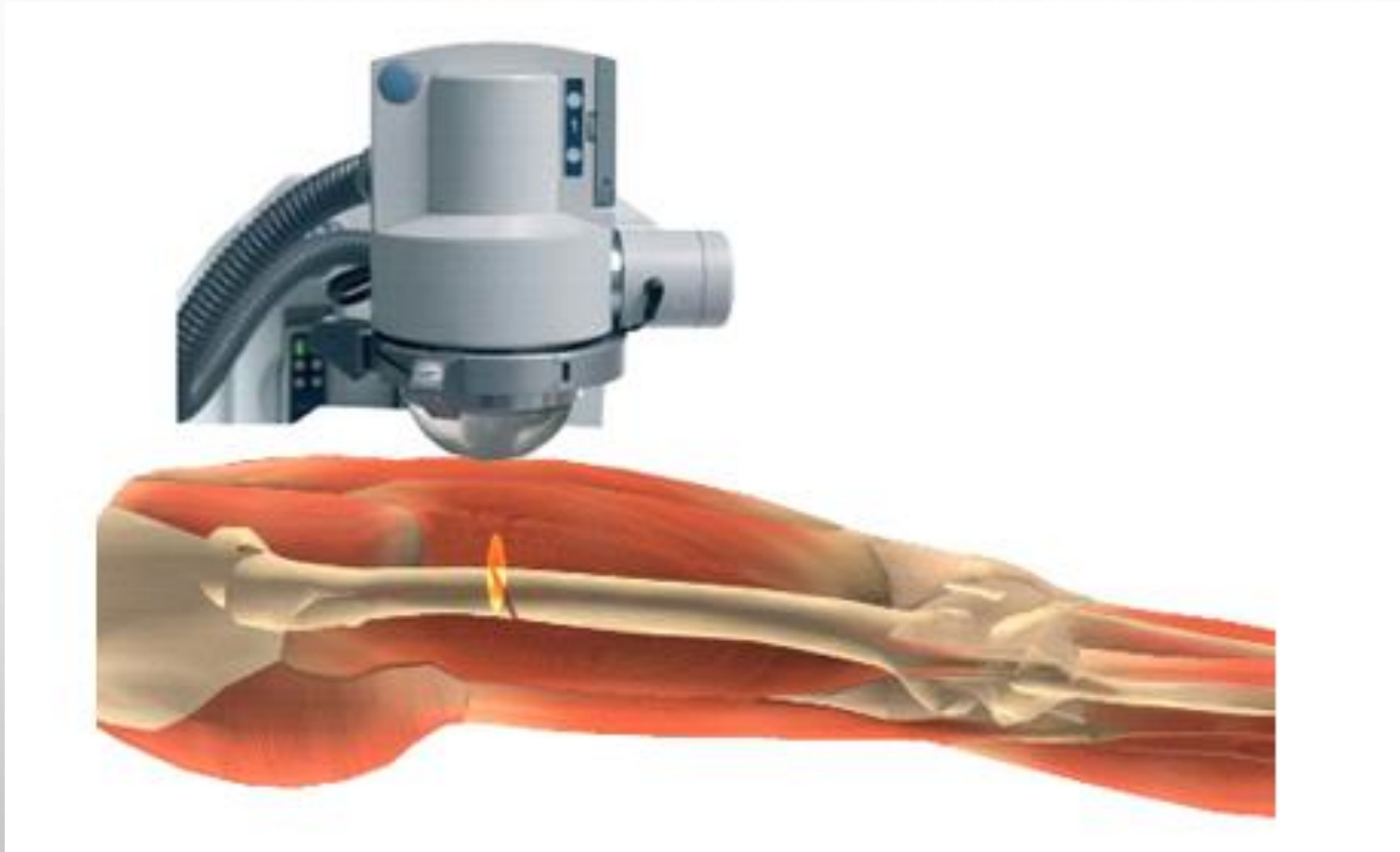
- AS ESWT INITIATES HEALING BY ANGIOGENESIS WHERE CAPILLARIES ARE CROSSING THE NON-UNION GAP, IT INCREASES SUCCESS WHEN AVOIDING MICRO MOVEMENTS FOR FOUR TO SIX WEEKS AFTER THE TREATMENT.
- IF NECESSARY THIS CAN BE ACHIEVED BY ORTHOSIS, PLASTER CAST AND/OR NO WEIGHT BEARING FOR THIS PERIOD OF TIME.
- IN VERY INSTABLE NON-UNIONS ESPECIALLY IN THE LOWER LIMB IT MIGHT BE NECESSARY TO APPLY AN EXTERNAL FIXATOR IN THE SAME SESSION TO ENSURE SUFFICIENT STABILITY.

Case Primary Sector

- SKIING ACCIDENT 1.5 YRS PRIOR TO FIRST EXAMINATION . THE PLAN WAS ANOTHER OPERATION. BY CHANCE HEARS ABOUT ESWT BEING DONE AT OUR CLINIC. WISHES TO TRY BEFORE ANOTHER OPERATION.







W. Schaden et al. / International Journal of Surgery 24 (2015) 179e183

TIMELINE

- JAN 2018 SKIING ACCIDENT. SPIRAL TIBIAL AND FIBULAR SHAFT FRACTURE
- OPERATED SAME DAY: INTRAMEDULLAR ROD, 5 INTERLOCKING SCREWS
- X – RAY 0-2-4-6 MONTHS AFTER OPERATION: CLASSIFIED AS NON-UNION
- 11 MONTHS AFTER: RENEWED SURGERY. FIXATIONS SCREWS
- 16 MONTHS AFTER TRAUMA: NON-UNION CLASSIFICATION
- 16 MONTHS AFTER TRAUMA: FESWT ONE SESSION A WEEK FOR THREE WEEKS (3 CYCLES 1 MONTH BETWEEN EACH)
- 18 MONTHS AFTER TRAUMA INCREASING CALLUS POSTERIOR
- 20 MONTHS AFTER INCREASING CALLUS
- 23 MONTHS AFTER TRAUMA CALLUS FORMATION. RUNNING 2 KM PAIN FREE

- 17/6: 2500, 3 HZ, 0.45-0.50 MJ/MM², 36.83J
- **RESULTING IN 4 DAYS WITH EXCESSIVE PAIN**
- 24/6: 3000 SHOTS, 4 HZ, 0.25 MJ/MM², 24.28 J
- X-RAY JULY 2019 STILL NO SIGNS OF OSSIFICATION
- 19/9: 4500 SHOTS, 5 HZ, 0.2 MJ/MM², 26.04 J
- **X-RAY: 4/10 SIGNS OF OSSIFICATION**
- 31/10: 4000 SHOTS, 3 HZ, 0.4 MJ/MM² 38.79 J
- **X-RAY: 17/12 SIGNS OF OSSIFICATION CONFIRMED**

FUNCTION:

17/6:

LEFS: 48/80

PSFS: 27/30

VAS: AVERAGE LAST WEEK: 3/10, BEST LAST 24 TIMER 0/10, WORST LAST 24 TIMER 7/10

27/9: (STARTS RUNNING ON TREADMILL)

LEFS: 64/80

PSFS: 22/30

VAS: AVERAGE LAST WEEK : 2/10, BEST LAST 24 TIMER 0/10, WORST LAST 24 TIMER 5/10

20/11:(TREADMILL RUNNING 2 KM WITHOUT ANY PROBLEM)

LEFS: 70/80

PSFS: 13/30

VAS: AVERAGE LAST WEEK : 2/10, BEST LAST 24 TIMER 0/10, WORST LAST 24 TIMER 2/10

CLINICALLY SIGNIFICANT

NOT CLINICALLY SIGNIFICANT

CASE SUBMITTED AND UNDER REVIEW.