

# Effect of Focused Extracorporeal Shock Wave Therapy in Intramedullary Screw Fixation for Fifth Metatarsal Stress Fractures in Athletes



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## Disclosure of Conflict of Interest

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# Background

- ✓ Intramedullary screw fixation is the most common treatment for fifth metatarsal stress fractures in athletes.
- ✓ An early return to sport after intramedullary screw fixation lengthens the time to obtain bone union and increases risk of refractures.

## THEREFORE . . .

An early bone union is important for athletes who desire an early return to play.



# Focused Extracorporeal Shock Wave Therapy (Focused ESWT)



- ✓ Promote the production of various substances which play an important role in bone formation.



- ✓ Widely used as nonsurgical treatment for bone disorders such as acute and stress fractures, delayed and non- unions.

## HOWEVER...

There are no studies investigating the effect of focused ESWT in intramedullary screw fixation for fifth metatarsal stress fractures.

# Purpose

- ✓ To clarify the effect of focused ESWT in intramedullary screw fixation for fifth metatarsal stress fractures in athletes.

# Materials

- ✓ A retrospective chart review
- ✓ April 2017 – August 2022
- ✓ Patients who underwent intramedullary screw fixation using the Herbert type screw for fifth metatarsal stress fractures
- ✓ Tegner activity score  $\geq 7$

## **Exclusions;**

- ✓ Minimum follow-up period  $< 2$  years
- ✓ Histories of surgical treatment for affected side of lower leg and concomitant other ankle disorders

# Methods

✓ The patients were divided into two groups:

**Group E:** Patients treated with focused ESWT after surgery

**Group N:** Patients treated without focused ESWT after surgery

✓ Clinical outcomes including

- Time to obtain bone union at the fracture site (weeks)
- Time to return to the original sport at pre-injury level (weeks)
- Treatment failures / complications

were compared between the two groups.

# Postoperative Focused ESWT Protocol



- ✓ Once a week
- ✓ Up to 3 to 4 times
- ✓ Administration: 2500 impulses
- ✓ Energy flux density:  
0.20 to 0.25 mJ/mm<sup>2</sup>
- ✓ Frequency: 4 Hz

DUOLITH SD-1 T-TOP Ultra

(Storz Medical AG, Tägerwil, Switzerland)



# Results

Athletes with fifth metatarsal stress fracture treated by intramedullary screw fixation. (n=37)

Excluded, n=3

2 patient had a follow-up period < one year.  
1 patient had a concomitant ankle disorder.

Patients included in the study. (n=34)

**Group E**  
(n=13)

**Group N**  
(n=21)

# Patient Demographics

	Group E	Group N	<i>P</i> value
Age, years*	18.0±2.1	18.6±3.3	.570
Sex, male/female, n	13/0	18/3	.270
Side, right/left, n	7/6	9/12	.725
Tegner activity score	8.9±0.3	9.0±0.2	.734
Follow-up period, months*	35.5±12.3	37.5±17.6	.732
Fracture site, zone II/III, n	8/5	12/9	1.00
Torg classification, I/II/III, n	4/7/2	5/10/6	.669

\*Values are expressed as mean ± SD.



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# Clinical Outcomes

	Group E	Group N	<i>P</i> value
Time to obtain bone union, weeks*	7.2 ± 1.0	9.3 ± 3.7	<.001
Time to return to original sport, weeks*	9.1 ± 0.9	11.8 ± 5.2	<.001
Treatment failures / complications, n (%)	0 (0%)	1 (4.8%)	.384

\*Values are expressed as mean ± SD.

# Conclusion

- ✓ Focused ESWT after intramedullary screw fixation for fifth metatarsal stress fractures in athletes may accelerate bone healing and lead to an early return to original sports.

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