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 ≥ 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:

 $0.20 \text{ to } 0.25 \text{ mJ/mm}^2$

✓ Frequency: 4 Hz

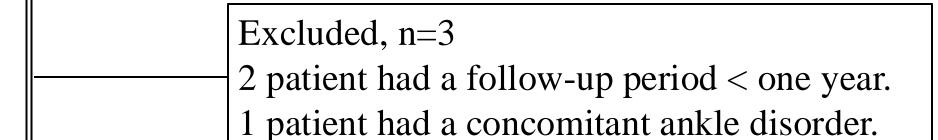
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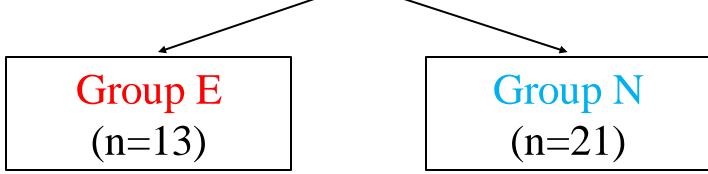


Results

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



Patients included in the study. (n=34)





Patient Demographics

	Group E	Group N	P 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. HYOGO MEDICAL UNIVERSITY

Clinical Outcomes

	Group E	Group N	P 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 \pm 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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