Can combined therapy with teriparatide and low-intensity pulsed ultrasound accelerate fracture healing with an Ilizarov external fixator?

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Presentation Title: Can combined therapy with teriparatide and low-intensity pulsed ultrasound accelerate fracture healing with an Ilizarov external fixator?

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My disclosure is in the Final Program Book. I have no potential conflicts with this presentation.
Introduction

- Ilizarov external fixators have many advantages in the treatment of fractures. However, a disadvantage of the Ilizarov system is the relatively frequent incidence of pin infection.

- It is an advantage for orthopedic surgeons to remove an Ilizarov external fixator as early as possible after surgery. Although both teriparatide and low-intensity pulsed ultrasound (LIPUS) have been found to accelerate fracture-healing processes, the effect of the combination of teriparatide and LIPUS in clinical bone fracture management remains unclear.

- Therefore, a retrospective study comparing the treatment effects of use of an Ilizarov external fixator alone and that of an Ilizarov external fixator combined with teriparatide and LIPUS was performed among elderly patients with lower limb fractures.
Subjects and Methods

- 38 patients, lower limb fracture with an Ilizarov external fixator, age over 60 years
  - Ilizarov external fixator alone (IEF alone)
  - Ilizarov external fixator combined with teriparatide and LIPUS (IEF combination)

* Teriparatide (20 μg subcutaneous injection daily or 56.5 μg subcutaneous injection once-weekly) and LIPUS (20 min/day) were started immediately after surgery for IEF combination group in an attempt to accelerate healing of the lower limb fracture with the Ilizarov external fixator.
## Result

Comparison of IEF alone and IEF combination

<table>
<thead>
<tr>
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<th>IEF alone (n=20)</th>
<th>IEF combination (n=18)</th>
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<tbody>
<tr>
<td>Mean age</td>
<td>64.1 (60-79 years)</td>
<td>67.2 (60-83 years)</td>
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<td>Duration of union (days)</td>
<td>111.9 (94–175 days)</td>
<td>72.1* (68-141 days)</td>
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<td>Bone density (YAM%)</td>
<td>61.3% (38-82%)</td>
<td>52.1% (30-79%)</td>
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<tr>
<td>AOFAS ankle-hindfoot</td>
<td>86.2 (72-100)</td>
<td>91.2 (82-100)</td>
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<td>standard scale</td>
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*p<0.05
Case 1 (pilon fracture, IEF combination)
A 79-year-old woman, YAM38%

- Chief complaint: Left ankle pain
- Past history: Hypertension
- History of present illness:

The patient was injured when she fell on a snowy road and was transported by ambulance to the previous hospital. Since comminuted fracture was observed and she was transferred to our department.

X-ray & CT on initial consultation
Postoperative X-ray & CT

Anterior-posterior view
Lateral view
Anterior-posterior view
Lateral view
Anterior-posterior view
Lateral view

81 days postoperative X-ray

Postoperative Range of Motion

Dorsiflexion
Plantar flexion

AOFAS ankle-hindfoot scale score: 100 (maximum score)
Case 2 (pilon fracture, IEF alone): A 60-year-old man, YAM69%

X-ray & 3D-CT on initial consultation

Postoperative X-ray

109 days postoperative X-ray

AOFAS ankle-hindfoot scale score: 100 (maximum score)
Conclusions

In elderly patients with lower limb fractures, combined therapy (teriparatide and LIPUS) showed a shorter mean duration of union than the Ilizarov external fixator alone. Combined therapy with teriparatide and LIPUS may become a useful option in the treatment of elderly patients with lower limb fractures.