Magnetic Resonance Imaging Evaluation of Hinged Ankle Distraction Combined with Intra-articular Injection of Human Growth Hormone

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**Purpose**

- To evaluate subchondral bone thickness, cartilage thickness, and subchondral bone cysts of the ankle joint using pre- and postoperative ankle magnetic resonance imaging (MRI), of patients who underwent hinged ankle joint distraction with external fixation and intra-articular injection of human growth hormone.

**Literature Review**

- Current literature supports the benefit of ankle distraction for the treatment of ankle arthritis. 1–4 Growth hormone is known to increase the formation of cartilage and size by an average of 1.5 mm in greatest width (range, 0–3.0 mm) (p=0.01) at 1 year post-op.

**Methods**

- Of 51 patients who underwent the procedure, the medical records of 17 were reviewed. 8 Bowen (62 percent) and 11 postoperative MRI scans were available for evaluation.

- A signal change (Cayle et al., JAMA) was used to measure subchondral bone thickness. Cartilage thickness and size of subchondral bone cysts were recorded as well.

- All patients had hinged ankle joint distraction with external fixation for 3 months.

- Preoperative and postoperative ankle MRI scans were obtained using a 1.5-T superconductive magnet (Siemens, Munich, Germany). The amount of cartilage thickness was measured.

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- Maximum dorsiflexion of the hinged ankle joint with hinged ankle distraction.

- Maximum plantar flexion of the hinged ankle joint with hinged ankle distraction.

- Postoperative anteroposterior view radiograph with hinged ankle joint distraction (approximately 8 mm).

- Intraoperative lateral view fluoroscopic radiograph after anterior ankle osteophyte resection.

**Results**

- All patients reported subjective pain relief.

- Adjuvant procedures performed included posterior muscle group lengthening, core decompression of the talus, partial resection of the tibia and deepening of the neck of the talus, and flexible or rigid osteotomy.

- Statistically Significant Values

  - Tibial and talar subchondral bone thickness decreased by an average of 0.5 mm (range, 0.5–1.5 mm) (p=0.03) at 1 year post-op.
  - Cartilage thickness increased by an average of 0.5 mm (range, 0–2.0 mm) (p=0.02) at 1 year post-op.
  - Subchondral bone cysts of the tibia and talus decreased in number by an average of two cysts (p=0.01) at 1 year post-op.

**Discussion**

- Our method of ankle distraction is known to be beneficial for reduction of pain and increase in function for patients.5 This MRI study shows ankle distraction with intra-articular injection of human growth hormone results in a statistically significant decrease in subchondral bone thickness, increase in cartilage thickness, and decrease in size and number of subchondral bone cysts.

- Therefore, this study indicates that human growth hormone in conjunction with ankle distraction offers the most superior method for ankle joint preservation.

**References**


