

Marrow Cellution: Autologous Bone Marrow Aspiration use in an Ankle Fusion

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OVERVIEW/ DISCUSSION

Successful fusions in challenging cases can be facilitated when the site is augmented with Autograft bone. Autograft bone that is harvested from the iliac crest is generally considered the “gold standard” for joint fusions. However, graft harvests are typically associated with frequent complications and pain. Bone marrow aspirated from the iliac crest and other bones with reservoirs of stem cells provide an alternative to traditional autograft harvest. Traditional aspiration retrieval methods with open-ended trocars diminish the number of key stem and progenitor cells due to the peripheral blood that enters the trocar. Additional manipulation of traditional aspiration methods leads to volume reduction processing steps such as centrifugation outside of the sterile operating room field. A Marrow Cellution aspiration kit is confined to the sterile field minimizing peripheral blood infiltration with a closed stylet that pulls marrow cells from varying locations laterally through a fenestrated trocar. The current case involves a patient with end stage ankle arthritis who underwent an ankle fusion procedure. The Marrow Cellution kit was used to provide bone marrow aspirate and high quality bone autograft to the fusion site.

Clinical History

- A 55-year-old diabetic male presented with long-standing tenderness, swelling, and stiffness in his left ankle.
- He was diagnosed with ankle arthritis.
- He failed conservative treatment including shoe modifications, arthritis medications, cortisone injections, custom orthotics and physical therapy.
- X-rays were obtained which showed arthritis in the right ankle. (Figure 1)
- An arthroscopic (minimally invasive) ankle fusion was performed.

Findings & Treatment

Intraoperative Findings:

Standard arthroscopic approach was used to denude the ankle of remaining cartilage and hard subchondral bone. Arthritis was seen in the ankle joint with loss of cartilage and exposed cancellous bone. (figure 3)



Figure 1: AP & Lateral radiographs



Figure 2: arthroscopic “minimally invasive” setup and approach



Figure 3: arthritic ankle joint: removing remaining cartilage

Surgical Procedure:

The “Marrow Cellution” Autologous Bone Marrow Aspiration kit was used to aspirate bone marrow and harvest bone plugs from the previously prepped anterior iliac crest. (figure 4, 5, 6)

The bone plugs were then inserted into the prepared ankle joint via the arthroscopy portals prior to screw placement. (figure 7)

The bone marrow was injected into the prepared ankle joint. (figure 8)

3 screws were placed percutaneously across the ankle joint and verified with radiographs. (figure 8,9)



Figure 4: Trephine needle advanced to desired depth



Figure 5: extracting bone core from the iliac crest



Figure 6: Bone Marrow Aspiration



Figure 7: insert iliac crest bone cores thru the arthroscopy portals



Figure 8: Inject Bone Marrow aspirate into the prepared ankle joint



Figure 8: Percutaneous screw placement

Follow-up

Short leg splint placed and patient followed up in the office in 1 week. A short leg cast was applied and he remained non-weight bearing for 6 weeks. He had no complaints of pain, nor complications at the iliac crest donor site.

He had a successful pain-free ankle fusion with no complications and was happy with the results.



Figure 9. Final radiographs

CONCLUSION

This 55-year-old high-risk patient presented with symptomatic arthritis in his ankle. An arthroscopic ankle fusion was performed. A successful outcome was facilitated with the use of autogenic bone marrow aspiration and cancellous iliac crest bone autograft. There were no morbidities at the donor site or complications at the fusion site.