

Marrow Cellution: Autologous Bone Marrow Aspiration & Autograft use in Fusion of the Metatarsal Phalangeal Joint (1st MTP joint)

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OVERVIEW/ DISCUSSION

Successful fusions in challenging cases can be facilitated when the site 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 and 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 1st MTP joint arthritis who underwent a fusion procedure. The Marrow Cellution kit was used to provide bone marrow aspirate AND high quality bone autograft dowels to the fusion site.

Clinical History

A 60-year-old female with controlled diabetes presented with long-standing tenderness, swelling and stiffness in her left 1st MTP joint. She was diagnosed with grade IV. Hallux Rigidus and failed conservative treatment including shoe modifications, arthritis medications, cortisone injections and custom orthotics. X-rays were obtained which showed arthritis in the right 1st MTP Joint (figure 1).

Findings & Treatment

Intraoperative Findings:

Standard dorsal open approach was used to denude the joint of remaining cartilage and hard subchondral bone. Arthritis was seen in the 1st MTP joint with loss of cartilage and exposed cancellous bone (figure 2).

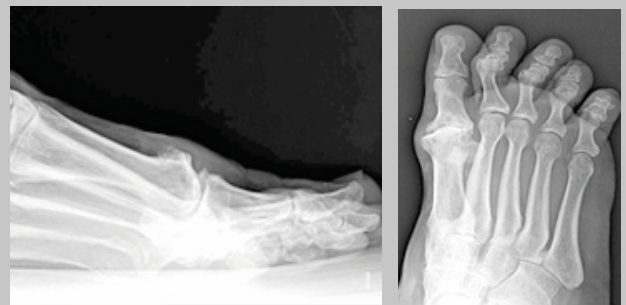


Figure 1: AP & Lateral radiographs



Figure 2:
Exposed arthritic
1st Metatarsal
Phalangeal joint

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 1st MTP joint was denuded of cartilage and hard subchondral bone with a drill and bone reamers (figure 7).

The bone plugs were then inserted into the prepared 1st MTP joint prior to hardware fixation (figure 8).

Bone marrow aspirate was injected into the prepared joint as well (figure 8, 9).

The joint was aligned, compressed and stabilized with a dorsal plate and a cross compression screw then verified with radiographs (figure 10).

Follow-up

She was allowed to bear weight in a cam walker boot.

The fusion was protected for 6 weeks until it was clinically and radiographically fused.

She had a successful pain-free 1st MTP joint fusion with no complications and was happy with the results.

CONCLUSION

This 60-year-old high-risk diabetic patient presented with symptomatic arthritis in her 1st metatarsal phalangeal joint. A 1st MTP joint fusion was performed. A successful outcome was facilitated in only 6 weeks 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.



Figure 4:
Trephine needle
advanced to desired



Figure 5:
Extracting bone core
from the iliac crest.



Figure 6:
Bone Marrow Aspiration



Figure 7:
Preparation of the 1st MTP Joint



Figure 8:
Autograft plugs placed into
the prepared fusion site



Figure 9:
Bone Marrow Aspirate
injected into the fusion site

Figure 10:
Reduced and stabilized 1st
MTP Joint with plate & screws

