

Marrow Cellution: Autograft Bone Harvested from the Iliac Crest use in Challenging Fusion

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OVERVIEW / DISCUSSION

Success in challenging fusion cases can be enhanced when the site is augmented with autograft bone harvested from the iliac crest. This procedure is generally considered the “gold standard” for complicated fusion procedures. However, graft harvests in certain instances have been associated with long-term complications and significant pain. A new device (Marrow Cellution or MC) which aspirates bone marrow from the iliac crest (and other bones with reservoirs of stem cells) provides a less invasive alternative to traditional autograft harvest. Additionally, while traditional aspiration retrieval methods use open-ended trocars which diminish the number of key stem and progenitor cells due to the peripheral blood that enters the trocar, the MC device is close-ended and requires no manipulation of the aspirate as there is no centrifugation required so no processing of the aspirate outside of the sterile field. Thus the MC Device may create the functional equivalent of autograft without the associated morbidity or increased sterility risks associated with off-field processing steps.

The Marrow Cellution aspiration kit provides 1) minimally invasive harvesting of intact bone dowels and 2) aspiration of marrow while minimizing peripheral blood infiltration. Harvesting an intact cancellous bone dowel which does not disrupt the highly organized living tissue of the bone is different from transplanting pieces of bone. Such grafts that maintain the micro-vascular within the graft do not show extensive resorption with the inherent difference based on the ability of intact bone to exploit the biology of normal fracture healing rather than through creeping substitution.

Clinical History

The patient was a 42-year-old male who had a previous microdiscectomy at L4-L5 eight years ago and revision microdiscectomy at L4-L5 four years ago. He presents with new-onset left leg pain and severe LBP.

Findings & Treatment

A second revision discectomy was offered, but the patient decided to proceed with an interbody fusion at the L4-L5 Level. Bone marrow was aspirated from the iliac crest and was combined with allograft and autograft. This combination was placed in the peek spacer, as well as in the anterior disc space.

Surgical Procedure:

The “Marrow Cellution” Autologous Bone Marrow Aspiration Kit was used to aspirate bone marrow and harvest bone plugs from the previously prepped posterior iliac crest.

Aspirate:

Posterior Superior Iliac Spine was marked, prepped and draped in sterile fashion. The Marrow Cellution bone marrow harvesting technique was then performed to ensure appropriate placement of the trocar with the trajectory being toward the PSIS. Care was taken to draw only one cc of aspirate from each position in the ileum, working distal to proximal.

Creating the Graft

Live cells from the bone marrow aspirate were used to hydrate the allograft. The mixture of live cells from bone marrow aspirate, autograft, and allograft were used to fill the interbody spacer.

Follow-up

After surgery, there was complete resolution of his radicular symptoms and the majority of his low back pain. Radiographic follow up was performed at two weeks, three months and nine months. He returned to work in approximately four months.

CONCLUSION

The Marrow Cellution kit can be used to provide high-quality bone marrow aspirate and intact bone dowels. Combining aspirate plus dowels with a graft extender will create bioactive bone logs with a cell content comparable to autograft with minimal morbidity that is suitable for use in spine fusion.



Iliac Spine Marked, prepped and draped in sterile



Bone Dowel Collection



Dowels Collection



Mixture of live cells form bone marrow



Pre-Op



Two Weeks



Three Months



Nine Months