ANALYSIS OF SPINE FUSION UTILIZING DEMINERALIZED BONE MATRIX. Walter R. Sassard, MD, Dan K. Eidman, MD, and P. Milton Gray, Jr., MD. Orthopaedic Research Center, St. Luke's Episcopal Hospital, P.O. Box 20269, M.C. 4-183, Houston, Texas 77225-0269.

INTRODUCTION: Surgical approaches and techniques to achieve fusion of the lumbar spine have changed over time and vary considerably today. One common element that has begun to receive more attention is the bone grafting procedure. Choice of graft materials and techniques utilized are both important. Freshly harvested autogenous bone is recognized as the standard against which to measure the performance of any graft material. Iliac crest tissue is the gold standard, though "local" bone harvested from the primary operative site is also used. However, the "second" surgical site (i.e., iliac crest) has a potential for infection or hematoma, and can be a significant clinical problem for an extended period after surgery. In an attempt to avoid the risks of donor site morbidity and complications associated with second site harvest procedures and to overcome limitations of supply of local autogenous tissue, a number of alternative graft materials have been tried and a variety of different types of allograft tissue are now available. While these allografts have outperformed heterografts, reported rates of graft incorporation have not been comparable to those with autograft. One particular allograft, a form of demineralized bone matrix (DBM) (Grafton® Allogenic Bone Matrix, Musculoskeletal Transplant Foundation, Holmdel, NJ) used in this study, was combined with local bone obtained from the laminectomy to form a composite graft in performing transverse process fusions. DBM is osteoconductive and osteoinductive, permits rapid vascular and tissue ingrowth, and might help provide acceptable rates of fusion without the need to harvest autogenous bone from a second operative site.

PURPOSE: This study reports the radiographic evaluation of fusion in available cases of spine fusion which utilized DBM as part of the grafting material. The purpose is to evaluate whether composite grafts of DBM can be used effectively in place of "second site" grafts and to try to identify key requirements for success with this approach. A second goal is to assess the effectiveness of using local autograft without the addition of iliac crest tissue.

METHODS: 61 patients who underwent 1 or 2 level posterolateral lumbar fusions (PLF) or a combined posterior lumbar interbody fusions and PLF with DBM composite grafts were compared to a control group of 62 patients who underwent similar procedures without DBM. Segmental internal fixation (Steffee-VSP or Rogozinski systems) was used in all cases. The two groups were comparable as to age and sex. The DBM group had more 2 level fusions (66% vs. 50%), more prior fusion attempts (36% vs. 16%), more worker's compensation cases (87% vs. 74%), and a higher proportion of disabled patients than did the control group.

RESULTS: Mean follow up of the DBM group was 15 months, ranging from 9 to 28; the control group was 19 months, with a range of 9 to 41. Overall fusion rate of the two groups was very similar: DBM was 73.8%, compared to 72.6% for the controls. Interestingly, the success rate for the use of local bone in the PLF was higher in both groups (83.7% of the DBM group vs. 78.6% of the controls), suggesting that this source of autograft could be a valuable resource, at least in certain circumstances.

CONCLUSION: Local bone appears to be an effective bone graft material. Also, composite grafts of DBM and local bone appear to be a viable alternative to the use of iliac crest tissue, which may be useful when the supply of local bone is inadequate. These preliminary results indicate that DBM may be a useful bone graft material in lumbar fusion. Future study may be needed to better define the factors such as patient selection or surgical approach that are predictive of success with this type of bone graft.

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