SUMMARY

Much has been learned about the basic science and technical aspects of bone harvest and fusion in the decades since the pioneers in spinal surgery developed their early techniques.

The present study has been designed to evaluate the success of bone fusion after anterior decompressive surgery for various types of pathology in one hundred patients when using autogenous bone grafts compared to use of synthetic bone substitutes materials. Internal instrumental fixation was accomplished for all cases to nullify other factors concerned in fusion process as immobility , graft site stresses, etc.... The synthetic materials were used for short defects grafting , while the autogenous bone was used to cross both short and long defects.

The incidence of bone fusion success on using the autogenous bone grafts was 97%, while it was 91% on use of synthetic materials for short discectomy sites. For long corpectomy defects, the failure of bone to cross the defects was 6.5% when using autogenous bones. However, the use of internal instrumentation allowed solid fibrous arthrodesis in all cases, whatever the nature of the incorporated graft.

Donor graft site complications were common among the studied cases with prolonged postoperative hospital stay and morbidity.

Autograft remains the optimal form of graft substrate because it is osteoinductive, osteogenic, and osteoconductive. However, the advantages of autograft must be weighted against the potential morbidity of the graft harvest. Pain, injury to surrounding neurovascular and soft tissue structures, fracture, haematoma , and poor cosmesis are all potential complications of graft harvest from

the iliac crest. Although a clear understanding of the anatomy of the iliac crest and surrounding structures and meticulous operating technique can minimize these complications, they can not be eliminated. Severe, permanent complications are rare, however.

Allograft has comparable osteoconductive properties to autograft but is less effective as an osteoinductive agent and has no osteogenic capacity because there are no viable mesenchyma or osteoblasts in these processed specimens. An unlimited supply of cancellous and corticocancellous graft material is available in certain countries where bone banks are allowed.

Coralline and other synthetic bone graft substitutes have limitations in their efficiency as grafts as these are only osteoconductive scaffolds for bone fusion. Their capacities for fusion of long segments of bone defects are questionable. Discovery of the bone morphogenetic protein (BMPs) subclasses and bioengineering technology should optimize the efficiency of the fusion process. The future of bone fusion will likely involve the addition of bioengineered BMP to autograft, allograft , or synthetic bone substitute to enhance the capability for successful bone fusion.