

GRANULES HYDROXYAPATITE APPLICATION IN FRACTURES

Hafiz A.¹, KA Khalid¹, Azril MA.¹, Shukrimi A.¹, Nazri MY.¹, Aminudin CA.¹, Zamzuri Z.¹, Fazan F.²

¹Department of Orthopaedics, Traumatology & Rehabilitation, International Islamic University Malaysia,

²Advance Materials Research Centre, Kedah, Malaysia

INTRODUCTION: In conjunction with a multi-institution research project, towards achieving the production of a locally made bone graft substitute. Hydroxyapatite (HA) granules made from local raw materials have been fabricated using a novel method (Patent (Pending) No. PI 2004 0748). The granules were characterised both chemically and physically and found to abide by the ASTM F1185 - 88 (1993) specification that covers the material requirements for HA intended for use as surgical implants. A phase 1 clinical trial involving the use of the granules for root socket obliteration in young healthy adults following tooth extraction was performed. Based on the results of these studies, the material was approved for a phase 2 clinical trial. The study was approved by the University and Hospital Clinical Ethical Committee in July 2005

Objectives: 1) To study the usage of GranuMas™ as bone substitute material.
2) To analyse the common conditions patterns that need bone substitute material.
3) To study the functional outcome of operative treatment after the usage of GranuMas™.

METHODS: Young healthy adults (age above 18) who have had recent trauma resulting in a closed fracture that requires bone grafting with no other complications were included in the study. Non union which is uninfected was included in the case study. Most of the patient was involved in road traffic accident.

Inclusion and exclusion criteria were used to guide the selection. Clinical and radiological observations were made and recorded. Radiograph was taken at post-operatively, 6, 12 weeks, 6 months and yearly basis.

Measurements are made and the results was analysed. This represents the results of patients that have been operated on since August 2005

RESULTS: 35 patients were treated using the GranuMas™ as bone substitute. All showed excellent and good results. No collapse of bony part noted during follow up. Union was noted in all of the cases. The granules degradation was slow this is noted if large amount of HA being used. All patients recover well post

operatively. Cases operated includes distal end of radius fractures, non union femur, comminuted fractures head of radius, supracondylar femur and tibial plateau fractures. Locking plates (AO plates) was used in most of the cases as implant.



Figure 1: Non union and at 1 year post nailing



Figure 2: Fracture distal radius with bone loss and 6 months post plating

DISCUSSION & CONCLUSIONS:

Union noted in all cases. The HA granules showed osteoconduction functions as for the bone to heal. Callus formation noted in all cases. GranuMas™ usage showed good outcome results as bone substitute material.