Calcaneal lengthening osteotomy for pes planovalgus using artificial bone graft material

Avoiding donor site morbidity

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Purpose
Calcaneal lengthening osteotomy can be used for correction of painful pes planovalgus. Requires graft material to be inserted as a bone wedge at the osteotomy site.

Obtaining autologous graft material from the iliac crest in children;
● painful procedure
● puts the child at risk for growth arrest and iliac wing deformity.

New structural bone graft materials;
● mixture of porous hydroxyapatite (HA) and tricalcium phosphate (TCP) being developed
● can prove useful in paediatric orthopaedic surgery.

We hypothesized; structural artificial graft can be used for calcaneal lengthening osteotomy.

Methods
Prospective cohort study with ethical approval conducted October 2010 – September 2011.

Calcaneal lengthening;
● 8 children and adolescents (9 feet), mean age 13.1 years (range 6.6-19.2)
● using wedge shaped HA/TCP graft material
● cast applied for 6-7 weeks after surgery.
● internal fixation of the osteotomy was not used.

Follow up; radiographs, computed tomography (CT) and paedobarography.

Results
Healing of the osteotomy obtained in all cases on radiographs and CT images.

Radiograph showing graft inserted in calcaneus

Sagital CT image with healing in osteotomy

CT-3D showing healing in osteotomy

At one year follow-up;
● clinical examinations
● paedobarography

showing satisfying results of surgery.

Pre-op paedobarography

Post-op paedobarography

No graft failure or wound related infections observed.

Conclusion
Harvesting of autologous graft from the iliac crest may be avoided for calcaneal lengthening procedures using HA/TCP graft material.

We report satisfying short term results;
● prospective study
● one year follow-up
● healing of the osteotomy achieved in all cases.