INTRODUCTION:
Closed reduction and percutaneous pin fixation either by crossed pinning construct (CPC) or lateral divergent pinning construct (LDPC) are the recommended treatment for displaced (Gartland type 2 & 3) supracondylar humerus fractures (SCHF) in children. Many studies have compared the biomechanical stability between these two. A biomechanical analysis of varying crossing point location in CPC has not been performed previously. The main objective of this study is to compare the stability of various crossing point location in CPC has not been performed previously. The main objective of this study is to compare the stability of various crossing point location in CPC and LDPC in treatment of SCHF in children. The other objective is to compare the stability between CPC and LDPC in the treatment of SCHF in children.

METHODS:
Thirty synthetic humeri were osteotomized simulating the SCHF. Specimens were all anatomically reduced and pinned using two 1.6 mm Kirschner wires (K-wires) in five different constructs namely centre point CPC, medial point CPC, lateral point CPC, superior point CPC and LDPC. Six samples were prepared for each construct and were tested for linear forces (extension, flexion, valgus, varus) and rotational forces (internal rotation and external rotation). Data for fragment stiffness (N/mm or Nmm/degree) were analysed and a level of P<0.05 was considered statistically significant.

RESULTS:
The centre point CPC was the stiffest for both linear and rotational force but Lateral point CPC, and Superior point CPC showed no statistically significant stability difference when compared to the stiffest construct (centre point CPC). Lateral divergence construct showed no statistically significance rotatory instability, but showed significant linear instability when compared to centre point CPC.

DISCUSSION AND CONCLUSION:
The Centre point CPC was proved to be the stiffest construct. However, the stability of lateral point CPC and superior point CPC were comparable and showed no statistically significant difference when compared to Centre point CPC. If crossed pinning construct was chosen as method of treatment, the treating surgeons do not necessarily have to revise the crossed wire fixation in order to get perfect centre crossing point fixation. This will eventually reduce the numbers of attempt during K-wire insertion and reduce the possible complications associated with multiple attempt procedures.

REFERENCES: