BACKGROUND:
Equinovarus foot deformity is one of the most common foot deformity in patients with cerebral palsy. When a component of fixed deformity was established, only tendon transfer procedure couldn’t successfully correct it. Multiple bone osteotomy, or even arthrodesis of foot may be required and should be considered before tendon transfer procedure. There was limited data on outcome of osteotomy and fusion for fixed equinovarus deformity. We would like to report the result of multiple bone osteotomy and fusion for equinovarus deformity of foot in cerebral palsy.

MATERIALS & METHODS:
Retrospectively reviewed on all patients with cerebral palsy who had a problem of fixed equinovarus deformity of foot and underwent bony surgery at Queen Sirikit National Institute of Child Health between 2007-2014. All patients had a minimum of 2 years follow-up. Steps of surgery was evaluated in operative room. Equinus component would firstly be evaluated and corrected by lengthening or recession of achilles tendon by Z-plasty or intramuscular recession. Secondly, we evaluated component of hind foot varus. If valgus motion of the hind foot wasn’t given, we considered correcting it by Dwyer calcaneal osteotomy. Thirdly, Midfoot cavus and supination component would be detected and corrected by cuboid wedge osteotomy or calcaneocuboid joint fusion depended on severity of deformity. Lastly forefoot cavus and adduction component especially in the first metatarsal bone was evaluated and corrected with 1st metatarsal wedge osteotomy.
After step of bone surgery tendon transfer procedure would be considered if the tendon still was active preoperatively.
All patients were followed up and examined the feet every 6 months. Goal of treatment is a plantigrade and painless weight bearing foot so the goal was assessed together with recurrent deformity, over correction, complication.

RESULTS:
51 feet (40 patients) were included in this study. 22 cases are Hemiplegia, 13 diplegia and 5 triplegia. Mean age at surgery was 9 years 8 months old. 31 in 51 of all feet underwent only multiple bone osteotomy. 13 feet underwent combined procedure and only 7 in 51 feet underwent triple fusion. Outcome of mean follow up time (4.2 years) showed that 78% (40/51) of all feet were plantigrade weight bearing. 25% of all feet had some components of recurrent deformity. 11 feet (21%) were considered to do second surgery because of non plantigrade weight bearing.

DISCUSSIONS:
Outcome of triple fusion group achieved plantigrade weight bearing more higher by 86% compared to the osteotomy group by 77%. Although the severity of deformity and age in triple fusion group were rather than the osteotomy group, we could early detect the fixed deformity and correct it before doing triple fusion, salvage procedure. Forefoot cavus could be corrected by 1st metatarsal osteotomy, midfoot supination and cavus by closed wedge cuboid or calcaneocuboid joint fusion and hind foot varus by closed wedge calcaneous. Tendon transfer procedure required active motor function to keep the result.

CONCLUSION:
Fixed equinovarus deformity of foot in cerebral palsy could be completely corrected not only by triple fusion but multiple bone osteotomy (1st metatarsal, cuboid, calcaneous) also gave the plantigrade weight bearing especially in preteen patients. Recurrent deformity of