INTRODUCTION:
Osteoarthritis of the hip decreases the range of motion and muscle strength for walking. Severe joint pain and limitation of joint motion caused by deformity induce muscle weakness to patients with the end stage osteoarthritis of the hip. Consequently, walking ability and activity of daily living are limited by joint deformity due to osteoarthritis of the hip.

There are only a few studies which could assess changes in gait parameters before and after total hip arthroplasty (THA)\(^1\)\(^-\)\(^2\). They reported that patients decreased step length and velocity. However, few reports about walking ability estimated by plantar pressure distribution of coxarthrosis are seen\(^3\). Plantar pressure distribution of patient with end stage osteoarthritis of the hip was not reported. The aim of this report is to evaluate ability of standing and walking according to plantar pressure of patient with end stage osteoarthritis of the hip before THA.

METHODS:
Plantar pressure of sixteen foot of fourteen patients was measured before total hip arthroplasty. Eleven cases were in the end stage of coxarthrosis. Two cases were rheumatoid arthritis and one case was idiopathic osteonecrosis of the femoral head. Four cases were male, and ten cases were female. The affected hip was left in three cases, right in nine cases, and bilateral in two cases. The average age at first-visit was 68 years. The average age at measurement of plantar pressure was 69 years. The average bone mass index was 26.6kg/m\(^2\). Plantar pressure distribution was carried out using F-scan system (Kamata Industrial Inc, Japan, Figure 1) of 300 X 100 mm with a resolution of four sensors/cm\(^2\). This allowed assessment of the vertical ground reaction force during standing and whole gait cycle. Three consecutive measurements were obtained. The peak pressure and the center of pressure line were defined.

RESULTS:
Leg length is same in nine cases. Affected leg length in five cases is more than 1cm shorter than unaffected leg. Hip flexion contracture caused 2cm leg length inequality in one case. The average of Harris hip score was 45.5 before THA.

At standing, higher planter pressure at normal side or longer leg was found in twelve hips, and its center was located in hindfoot (Figure 2). Of these affected side, higher planter pressure peak existed at forefoot at usual gait in nine hips (Figure 2). Four hips had same planter pressure distribution. Higher planter pressure at affected side was found in only one hip.

Two hips had higher planter pressure distribution at affected side, but these centers of pressure line were unstable (Figure 3). Unstable center of pressure line during gait cycle or shortening of standing phase were found in eight hips (Figure 3). Wider planter pressure area was found in four affected foot than unaffected foot.

DISCUSSION:
All hips showed one of unusual findings as follows, higher pressure peak at normal side at standing, unstable center of pressure line during gait cycle, higher pressure is loaded on forefoot of affected side at standing or usual gait, or shortening of standing phase. Higher planter pressure at normal side or longer leg was found in ten hips (75.0%). Higher planter pressure peak existed at forefoot at usual gait in nine hips (64.3%). Unstable center of pressure line during gait cycle or shortening of standing phase were found in eight hips (51.7%).

These findings may be in compensation for leg length inequality, hip pain or muscle weakness. Future investigation of planter pressure after surgery may significantly contribute to our understanding of the etiopathogenesis of osteoarthritis of the hip and improvement after THA.

REFERENCES: