Background and purpose: Aseptic loosening is the most common indication for revision surgery after total knee arthroplasty (TKA). However, the diagnosis is often difficult from planar radiography as well as other methods, making decision regarding revision surgery problematic. Implant Movement Analysis (IMA) is a newly introduced method of analysing uncertain aseptic loosening of orthopaedic implants. This is the first study where this technique is applied for analysis of potentially loose knee prosthesis. The IMA technique is based on computer tomography (CT) with rotational as well as varus and valgus provocation to expose any movement of the implant relatively to the surrounding bone.
Our aim was to evaluate the role of IMA as a complementary method to planar radiography and clinical examination in diagnosing aseptic loosening of (TKA).

Methods: 40 patients with uncertain aseptic loosening TKA were analysed. All patients had symptoms that could be suspicious for aseptic loosening. Planar radiography was used to detect radiolucent lines. IMA was performed on all patients with rotational as well as varus – valgus provocation.

Results: Of the 40 knees planar radiography showed radiolucent lines in 22. Out of these 22 knees the IMA analysis showed loosening in 8. IMA showed no loosening in the17 knees without radiolucent lines.

Interpretation: IMA is a dynamic investigation where CT is used during forced provocation of the knee and there by loosening between bone and implant can be more accurate diagnosed. Many suspected TKA loosening's could be ruled out using this method and revision surgery avoided. When planar radiography shows no radiolucent lines the risk of a loose implant is very small.