ORIGINAL RESEARCH PAPER

Orthopaedics

COMPARATIVE ANALYSIS OF KNEE RADIOGRAPHS BETWEEN WEIGHT-BEARING AP AND ROSENBERG PA FLEXION VIEW

KEY WORDS:

Dr. Bibhudarshi Mohapatra

INTRODUCTION

Osteoarthritis (OA) of the knee is among the most prevalent causes of chronic pain and functional disability worldwide, with a higher predilection for the female population. It is a progressive degenerative disorder with multifactorial etiology, and in India, its prevalence has been estimated to be approximately 28.7%, with incidence increasing steadily with advancing age. The knee joint is most commonly affected, and the disease process is characterized by progressive loss of articular cartilage resulting in joint space narrowing (JSN), marginal osteophyte formation, subchondral sclerosis, cystic changes, and varying degrees of synovial inflammation. In advanced stages, the articular cartilage softens, ulcerates, and undergoes focal disintegration.

Plain radiography remains the oldest, most economical, and widely accessible imaging modality for evaluating cartilage degeneration in knee osteoarthritis. Several studies have demonstrated that optimizing radiographic techniques can significantly enhance diagnostic yield while reducing reliance on advanced imaging modalities. Radiographs play a crucial role in assessing disease severity, distribution, and progression by evaluating joint space narrowing within the tibiofemoral compartments.

The Rosenberg posteroanterior (PA) flexion view has been shown to be more sensitive in detecting joint space narrowing in both medial and lateral compartments when compared to conventional weight-bearing anteroposterior (AP) views. Early detection of JSN is critical, as it correlates strongly with clinical symptoms and functional impairment.

We hypothesized that combining standard weight-bearing AP radiographs with the Rosenberg PA flexion view would improve early detection of joint space narrowing and subtle degenerative changes, thereby enhancing the radiographic sensitivity for diagnosing knee osteoarthritis. The objective of this study was to evaluate, quantify, and compare these two radiographic views using the Kellgren–Lawrence (KL) classification, Ahlbäck grading system, and the International Knee Documentation Committee (IKDC) scoring system.

MATERIALS AND METHODS

This retrospective observational study included 31 patients (47 knees) who presented with knee pain to the outpatient department of Hi Tech Medical College and Hospital, Bhubaneswar, Odisha, between January 2024 and December 2025. Patients aged over 18 years with clinical symptoms suggestive of knee osteoarthritis were included. Exclusion criteria comprised secondary osteoarthritis, prior knee surgeries, and flexion deformity exceeding 30 degrees.

All patients underwent a comprehensive clinical evaluation, followed by radiographic assessment using two standardized views: a conventional weight-bearing AP view obtained in full extension and a standing Rosenberg PA flexion view acquired with the knee positioned at 45 degrees of flexion. For the Rosenberg view, bilateral knees were imaged simultaneously with the patellae in contact with the cassette. The X-ray beam was centered over the patella, positioned approximately 100 cm from the cassette, and angled 10 degrees caudally. Care was taken to avoid rotational malalignment.

Radiographic grading was performed using the Kellgren–Lawrence classification and Ahlbäck grading system, while the IKDC score was used for objective functional evaluation. For statistical analysis, IKDC grades (A–D) were converted into numerical values (1–4). Medial and lateral tibiofemoral joint spaces were measured using a vernier caliper.

RESULTS

The study cohort consisted of 13 males and 18 females, accounting for 47 knees (25 right, 22 left). The mean age was 53.8 years (range: 45–70 years). Four patients reported a prior history of knee injury, while six had associated comorbidities such as hypertension and diabetes mellitus.

Measurement of tibiofemoral joint spaces demonstrated earlier and more pronounced joint space narrowing on the Rosenberg PA flexion view compared to the standard weight-bearing AP view.

Statistical analysis using paired t-tests revealed a statistically significant difference between AP and Rosenberg views across all grading systems ($p < 0.005$).

DISCUSSION

The Rosenberg PA flexion view provides superior visualization of the tibiofemoral joint and improves early detection of osteoarthritic changes when compared to standard AP radiographs.

CONCLUSION

The Rosenberg PA flexion view significantly improves early detection and accurate grading of knee osteoarthritis when used alongside standard weight-bearing AP radiographs.

Limitations

The primary limitation of this study is the relatively small sample size.