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FEASIBILITY OF NAVIGATED FREEHAND CUTTING IN TOTAL KNEE SURGERY

Peter S. Walker, Ph.D. [1] Rachel E. Forman, M.S.E.[1] Chih-Shing Wei, Ph.D. [2] Kazuho Iesaka, M.D. [1]
Marcin Balicki, M.E. [2] Do Eun Kim, B.S.E. [2]

ABSTRACT

Current knee replacement technique involves numerous jigs and fixtures and a complex sequence of steps. The present study investigated the viability of freehand bone cutting, a technique that utilizes direct visualization from navigation without requiring jigs or fixtures. To test system feasibility, simulated upper tibia resections were performed using three different methods: simple visual markers, electromagnetic navigation of the saw, and instrumented linkage navigation of the saw. The instrumented linkage navigation system gave the most accurate and consistent results, with mean angular errors of less than 1.0° and mean deviation from the target height of less than 1.0 mm. It was concluded that freehand cutting is likely to be a viable alternative to jigs and fixtures when adapted to realistic surgical conditions.

1. Department of Orthopaedic Surgery
New York University School of Medicine/ Hospital for Joint Diseases
New York, NY 10010

2. Department of Mechanical Engineering
The Cooper Union for the Advancement of Science and Art
New York, NY 10003