

# **Automatic Digital PE Wear Measurement**

**Chen-Kun Liaw, MD; Chiou-Shann Fuh, PhD; Sheng-Mou Hou, MD; Rong-Sen Yang, MD; Tai-Yin Wu, MD**

[Introduction]: Quantifying the amount of wear is important for total hip arthroplasty because we can predict the prognosis early. Many digital methods have been reported, none of them are fully automatic. Using the cross correlation and edge detection operators, we developed a fully automatic program which can automatically recognize the prosthesis and measure the wearing.

[Material and Methods]: We simulated 64 hip X-rays using OpenGL, including four different abduction angles, four different anteversion angles, two different superior wearing, and two medial wearing. All 64 wearings were measured manually by an orthopaedic specialist using Dorr and Wan's method and then by our method. The results are compared.

[Results]: The average error of our program is 0.2mm where error of Dorr and Wan's method is 1.8mm. Because our method is automatic, there is no inter-observer nor intra-observer difference.

[Conclusion]: This study is from simulated image. Further clinical study with clinical X-rays is needed to justify our result.