

## **A Biomimetic Uncemented Hip Resurfacing Versus Various Biomaterials Hip Resurfacing Implants**

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**Abstract :** Cemented femoral resurfacings have experienced a revival for younger and more active patients. Future developments have shown that the uncemented version eliminates failures related to cementing implants. A three-dimensional finite element method (FEM) simulation was carried out in order to exploit a new resurfacing prosthesis design named MARMEL, proposed by a recent study with Co-Cr-Mo material, for comparing a hip uncemented resurfacing with a novel carbon fiber/polyamide 12 (CF/PA12) composite to other hip resurfacing implants with various bio materials. From FE analysis, the von Mises stress range for the Composite hip resurfacing was much lower than that in the other hip resurfacing implants used in this comparison. These outcomes showed that the biomimetic hip resurfacing had the potential to reduce stress shielding and prevent from bone fracture compared to conventional hip resurfacing implants.

**Keywords :** biomechanics, carbon-fibre polyamide 12, finite element analysis, hip resurfacing

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