TOTAL JOINT ORTHOPEDICS

KLASSIC® FEMUR
AURUM® TECHNOLOGY

The Klassic® Femur with Aurum® Technology features the same patented geometry and articulation as the Klassic® Femur and offers a **revolutionary ballistically bonded titanium nitride (TiN) surface** to provide a premium implant **without the deliberate addition of common metal sensitizers** such as nickel, cobalt, and chromium.

Aurum® is the first step as part of **TJO's multi-year plan to reduce the use of Cobalt Chrome** in orthopedic implants; it uses a patented ion beam enhanced deposition (IBED) process to create a well-structured, ceramicized surface layer that is interdigitated with the substrate while preserving the material and geometric properties of the implant. The Aurum® Femur fits seamlessly within the Klassic® Knee Family's Evolution of Stability® and is compatible with both the Klassic ONE® and our Flagship instrumentation.

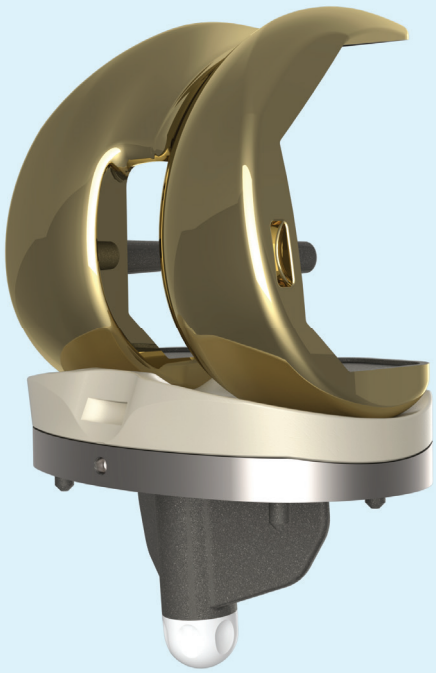
Titanium is up to 50% lighter than cobalt chrome, and the Aurum® Femur offers an implant that **more closely replicates the weight of native bone**.

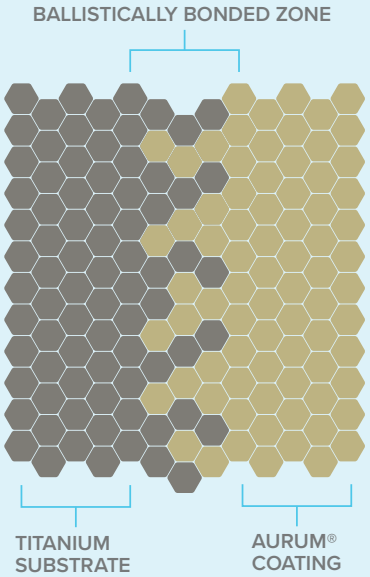
The Aurum® Femur is machined from bar stock titanium (Ti6Al4V) and coated with titanium nitride (TiN) for an exceptionally strong, lightweight implant designed for longevity.

AURUM® PROCESS

Aurum® uses a proprietary process to ballistically bond a five-micron thick titanium nitride coating to the titanium substrate. The result is a **hardened surface that offers exceptional wear characteristics without cobalt chrome**.[1]

Because the Aurum® IBED process is a physical process and not a chemical or thermal process, the temperature during bonding is below 400°F. Ion beam enhanced deposition application utilizes kinetic energy versus heat, so the coating environment maintains a much lower temperature, preserving the integrity of TiN's strength and hardness.





Aurum® features increased ductility that more closely matches the titanium substrate, allowing the materials to move together during the natural flexion of the implant.

EFFICIENCY BY DESIGN®

MATERIAL PROPERTIES

The Aurum® process offers significantly improved wear-resistance, abrasion-resistance, and surface hardness when compared to cobalt chrome.

WEAR RESISTANCE

Mode I wear testing was performed on pristine Aurum® and cobalt chrome femurs against conventional polyethylene (UHMWPE) to 5,000,000 cycles. The femurs were then scratched with sandpaper and run for an additional 3,500,000 cycles (Fig. 1). Aurum® Femurs showed significantly less wear than cobalt chrome (CoCr) femurs under Mode III wear testing (Fig. 2).[2]

Fig. 1: Klassic® CoCr (left) and Aurum® (right) Femurs after scratching and 3.5M cycles of wear simulation

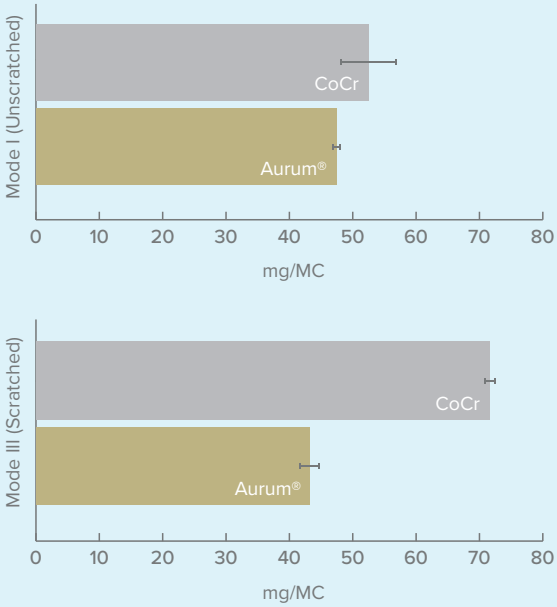


Fig. 2: Aurum® vs. CoCr Knee Simulator Wear Rate

MATERIAL HARDNESS

During scratch hardness testing, a stylus is drawn across the surface of the implant at a consistent load. The scratch hardness is calculated by determining how much material is displaced by the stylus. Aurum® Femurs showed significant improvement in scratch resistance over cobalt chrome femurs (Fig. 3).[3]

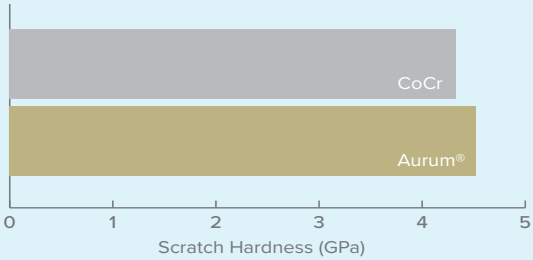
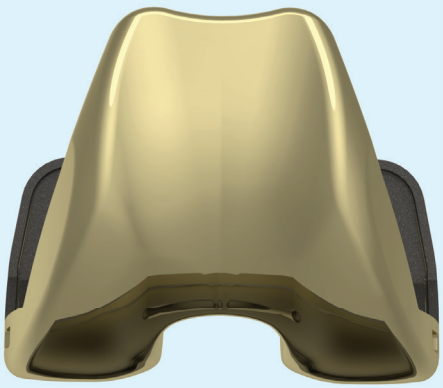


Fig. 3: Scratch hardness comparison of CoCr and Aurum®



Klassic® Femur with Aurum® Technology

MATERIAL STRENGTH

The Klassic® Femur with Aurum® Technology demonstrated equivalent fatigue strength to the traditional CoCr Klassic® Femur at 10,000,000 cycles of loading (Fig. 4).[4]

Fig. 4: Aurum® Femur during fatigue strength testing

[1-4] Data on file

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