Metal Particulate Comparison: Shaver Blades & Burrs

DePuy Synthes Mitek Sports Medicine -Versus- Major Market Tested Competitors (Smith & Nephew, ConMed LINVATEC, Stryker, and Arthrex)

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Objective:
To compare the quantity of metal particulate (shedding) generated during simulated use of arthroscopic shaver blades and burrs. These devices, with dynamic metal on metal contact, are utilized for controlled cutting, burring, shaving and abrating of bone and tissue during orthopedic joint procedures.

Methods:
DePuy Synthes Mitek Sports Medicine has developed a method to quantify and characterize the particles generated by blade & burr instruments during orthopedic joint procedures. These tests capture loose metal particulate which may have the opportunity to enter the joint space during instrument use. For blades, this is accomplished by operating the device under load in a fluid environment for a specific amount of time, and then passing the fluid through a filter to capture the particulate. For burrs, a media representing bone is ablated using the burr cutting flutes. Any metal particulate that is generated is segregated and captured on the same type of filter used for blades. These filters are then analyzed by a scanning microscope to determine the quantity of generated particulate (percent filter coverage).

Results:
DePuy Synthes Mitek Sports Medicine Blades and Burrs produced less metal particulate than each of the major market tested competitors (95% confidence 2-sample t-test against Smith & Nephew (p-value = 0.000), ConMed LINVATEC (p-value = 0.024), Stryker (p-value = 0.013), and Arthrex (p-value =0.007). Mitek Sports Medicine Blades and Burrs not only produced the least amount of metal particulate on average (μ = 0.07), but also produced the most consistent results, yielding the lowest standard deviation (σ = 0.13) when compared to the same major market tested competitors: Smith & Nephew (μ = 0.49, σ = 0.89), ConMed LINVATEC (μ = 0.25, σ = 0.52), Stryker (μ = 0.27, σ = 0.34), and Arthrex (μ = 0.88, σ = 1.46).²

Conclusions:
A study has shown that metallic microparticles have the potential to induce intra-articular damage through a synoviocyte-mediated cytokine response.¹ The tested major competitors generated on average, up to 500% (5X) more metallic particles than the Mitek Sports Medicine shavers and burrs.

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