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股関節脱臼における回収寛骨臼ポリエチレンライナーの設計と摩耗への影響

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Effects of Retrieved Acetabular Polyethylene Liner Design and Wear on Hip Dislocation

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Dislocation is a common complication of total hip arthroplasty. This study uses a novel analysis technique and retrieved acetabular cups to investigate the relationships between liner geometry, polyethylene wear and impingement, and dislocation history. Forty-eight, non-lipped polyethylene liners from various manufacturers were inspected for peripheral rim impingement damage. Cup depth (distance between liner inner rim and femoral head center placed in the articular surface) was measured and the three-dimensional head penetration into the polyethylene liner was calculated. Thirteen (27%) retrieved liners had rim impingement damage and twelve (25%) had clinical dislocation. Impingement damage was only weakly correlated with dislocation history and was not correlated to wear. Liners retrieved from patients with a dislocation history were significantly shallower by design and had less wear depth (e.g. less wear in) because of shorter duration of function. Articular cup depth was less than 0.95 mm in all dislocated liners with 28 mm or 32 mm femoral heads. Cup depth was a statistically significant factor associated with dislocation history. Liners designed with deeper articular surfaces and liners with increased depth due to wear had significantly lower prevalence of dislocation. Polyethylene liners with a shallow cup depth had a higher prevalence of dislocation.

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