

Preface

There are four important criteria essential for a successful implant to achieve long-term stability and function: material, design, fixation of the prosthesis and wear of the articulation. Stability is achieved by fixation with bone cement or cementless press-fit using different designs of stems and cups. There are hundreds of implants on the market, all of them offering excellent results when used.

In contrast to the numerous implant designs, there are only three materials available to support the demands of long-term function: polyethylene, metal and ceramics. Wear of these articulating materials is one of the most important factors for successful long-term results in total hip arthroplasty.

In the early days of total hip arthroplasty, a metal head articulating with a conventional polyethylene cup was the gold standard. Unfortunately in many cases wear debris after long-term function resulted in osteolysis around the implant with subsequent loosening. Consequently, new materials and new options of combinations between cup and stem were introduced. Hard-on-hard bearings (metal-on-metal, ceramic-on-ceramic) became more and more popular, but their popularity was compromised by allergic reaction of metal, pseudotumours, fracture or squeaking of the articulating material. Consequently implant companies focused on development activities to overcome the shortcomings of their products. Conventional polyethylene was improved by high cross-linking techniques and furthermore by adding vitamin K. Pure aluminium oxide ceramic was improved by introducing ceramic composite implants.

The Tribology Day at the 12th EFORT Congress in Copenhagen focused on all these new products and their effectiveness in clinical use. Polyethylene topics cover the analysis of influence of vitamin E-blended cross-linked polyethylene in in vitro wear testing as well as in long-term clinical use. Metal-on-metal articulations are recently faced with loss of reputation due to allergic reactions and pseudotumours, especially in large-diameter head implants. Retrieval analyses and clinical survival papers address these issues. Fracture and squeaking are the main concerns with ceramic-on-ceramic articulations. Their frequency and clinical relevance are discussed and long-term results presented.

The authors of this book contributions hope that their chapters will meet your expectations and give a better insight to a still on-going improvement of wear reduction in total hip arthroplasty.

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Total Hip Arthroplasty

Wear Behaviour of Different Articulations

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