MATHYS
a company of enovis™

RM Pressfit

Pioneering, proven & isoelastic

PRODUCT INFORMATION

pioneering

As early as the 1970s, Robert Mathys, Sr. pursued the pioneering idea of developing isoelastic monoblock implants. [1] *This idea in combination with the equatorial pressfit described by Prof. Erwin Morscher* [2, 3] *and the tribological option of a vitamin E-enriched, highly cross-linked polyethylene (VEPE) resulted in the unique RM Pressfit vitamys cup.* [4]

PROVEN

The basic philosophy based on Wolff's law, [1, 5] *which has proven its worth over many years, convinces with excellent clinical outcomes* [6–10] *and outstanding international registry data.* [11–15]

Long-term clinical experience with the philosophy of elastic monoblock cups

Based on the proven concept of the elastic RM Classic Cup with excellent 20-year long-term clinical results. [7]

2009

RM Pressfit vitamys
vitamys – The E-factor makes the difference

2002

RM Pressfit
Portfolio expansion – Addressing customer needs

1983

RM Classic titanium-coated
The surface – a combination for success

1973

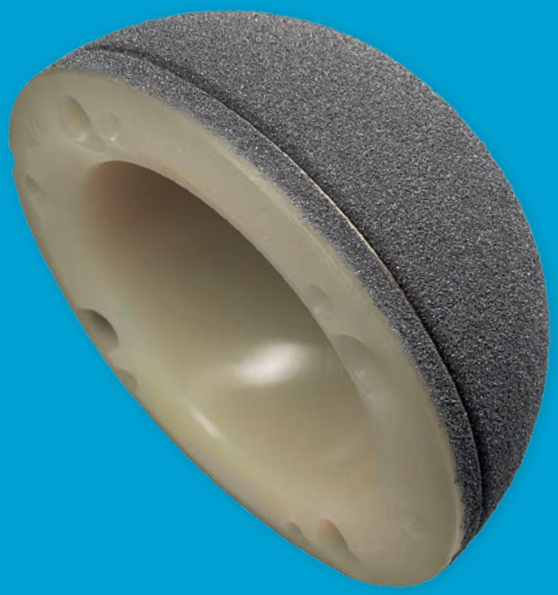
RM uncoated
The beginning – uncemented elastic monoblock design

1967

Müller cemented
The idea – design paradigms of a cemented cup

RM Pressfit

A further development of a proven concept



The RM Pressfit cup is based on the positive experience of the RM Classic cup and continues to carry on the concept of elasticity and of the titanium particle coating. [7, 16]

RM Pressfit

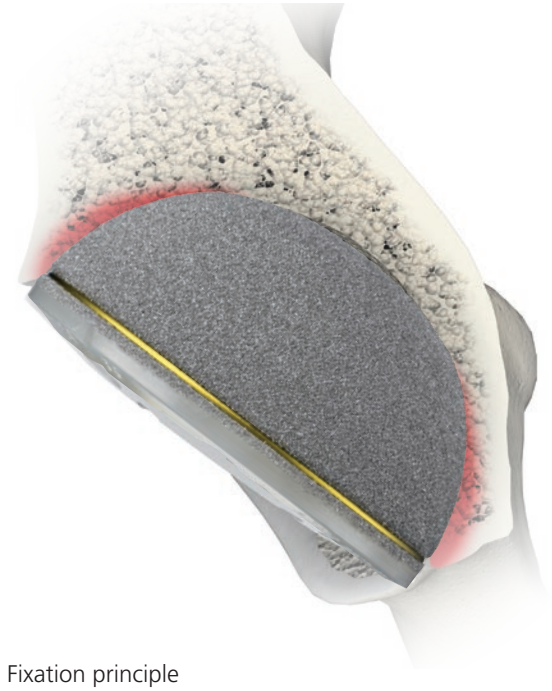
Uncemented monoblock press-fit cup

The RM Pressfit cup was developed based on the heritage of the RM Classic cup, whose concept of elasticity and titanium particle coating showed excellent clinical results after more than 20 years. [7]

RM Pressfit UHMWPE and RM Pressfit vitamys cups

The RM Pressfit cup is an uncemented elastic monobloc cup made from UHMWPE or vitamys, a vitamin E enriched and highly crosslinked UHMWPE. It has a special titanium particle coating applied to its outer surface.

vitamys is highly resistant to oxidation, ageing and wear. Even though the material is crosslinked, the mechanical properties of UHMWPE are largely maintained* which makes it an interesting solution especially for younger and more active patients. [4]



Fixation principle

Good primary stability and reliable secondary stabilisation

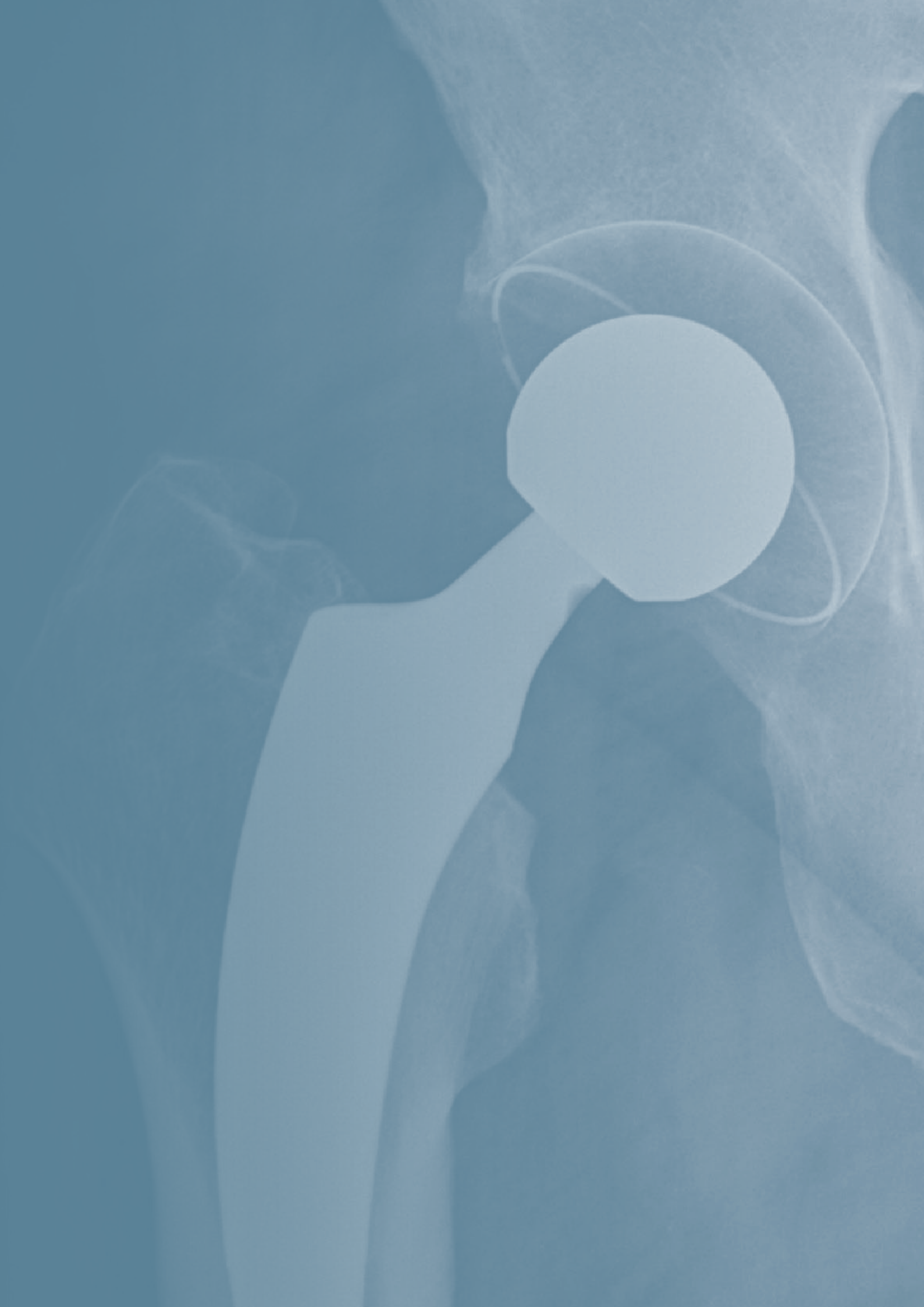
The design of the RM Pressfit cup is elliptical, with an oversizing at the cup's equator and a slight polar flattening. This design ensures good primary pressfit fixation of the implant and permits stable anchorage of the cup in the acetabulum. [2]

Sufficient primary stability provides the physiological conditions necessary for osseointegration and long-term fixation. [2] The proven titanium particle coating enhances this objective. [7]

If necessary, screws can be used for additional stabilisation.

The RM Pressfit cup can be implanted through different surgical approaches with only a few instruments and operating steps.

* Based on preclinical bench testing data



ISOELASTIC

The elasticity of the RM Pressfit vitamys cup matches that of the surrounding bone, [17] thus having a positive impact on the stress shielding behaviour. [18–21]

BONEPRESERVING

The interaction of low-wear isoelastic vitamys polyethylene (VEPE) [4] with maximum wall thickness [19, 22, 23] and titanium particle coating reduces the risk of osteolysis [4, 8, 24–27] and preserves the surrounding bone [7, 18, 20, 21, 28] in the long term.

X-Ray by courtesy of Dr Bosson

Elasticity

UHMWPE and vitamys as a material have an elasticity very similar to that of the human pelvic bone (Table 1). [4, 17]

The similarity of the physical properties of the implant and its adaptation to the deformation conditions occurring in the pelvis enable homogeneous and physiological transmission of force between the implant and the bone. As a result, periacetabular bone structures can be preserved in the long run, with low risk of stress shielding. [3, 18, 20, 21, 28]

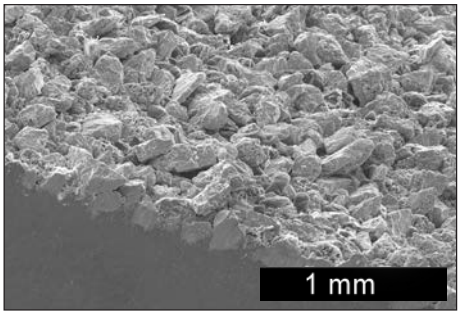
Mechanical properties	UHMWPE (ISO 5834-2)	Bone	TiCP (ISO 5832-2)
Density [g/cm³]	0.935	0.2–2	4.5
Modulus of elasticity [N/mm²]	1 000	500–6 000	105 000
Tensile strength [N/mm²]	25	8–150	>400

Table 1: Comparison of the material properties of bone, UHMWPE and pure titanium [17]

Titanium particle coating

The titanium particle coating prevents direct contact between bone and polyethylene. In addition, the mechanical connection between the cup and bone is improved further by the microstructuring of the coating. The titanium-coated RM cups are characterized by their bioinert behaviour and the known osseointegration ability of titanium. [29]

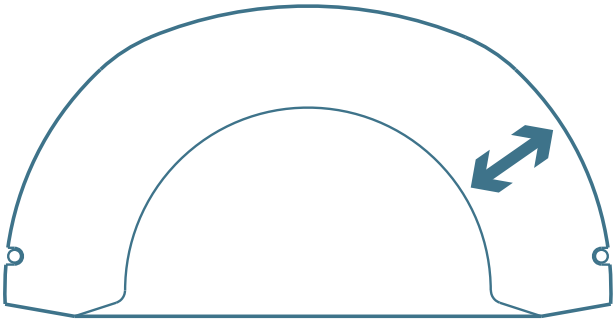
The particles are individually anchored in the polyethylene and not structurally connected to one another. Thus, the elasticity of the implant is not altered by the coating. [30]



Microscopic picture of the TiCP coating

Reduction of wear and osteolysis

Maximum possible polyethylene thickness for low wear rates. [22]



RM Pressfit UHMWPE

In the 5 year follow-up the mean annual wear rate for the RM Pressfit cup was 0.09 mm/year [31] and thus below the threshold of 0.1 mm/year. [32]

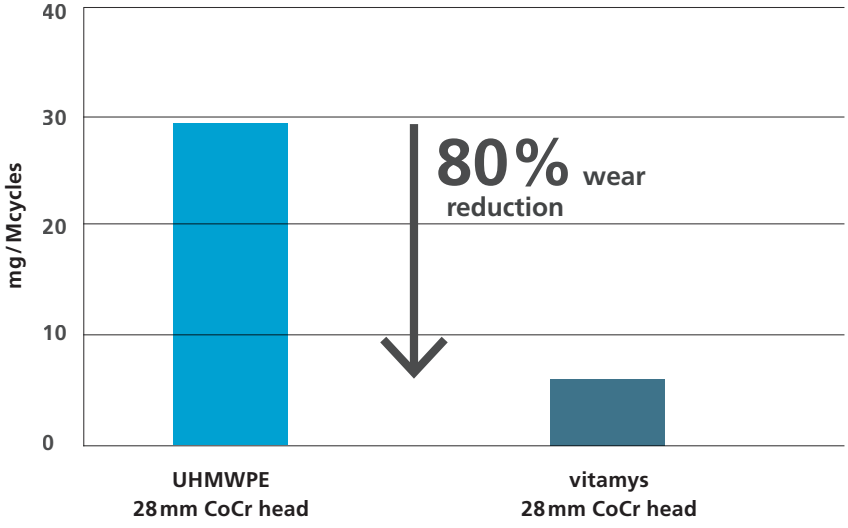
Mean cup migration was well below the > 2 mm that is considered to be an indicator for higher risk of implant loosening. [33–37]
The authors of this study conclude that «Migration and wear values for the RM Pressfit cup were well below the thresholds predictive of hip replacement failure. … In future, further improvements in wear rate and osteolysis may result from using new generation cross-linked polyethylene, which is suitable for this cup design.» [31]
These promising mid-term results have been confirmed by other clinical studies. [6, 9]

RM Pressfit vitamys

RM Pressfit vitamys is a promising solution to the challenge of long-term wear reduction.

In hip simulator tests, vitamys proves to significantly reduce wear compared to UHMWPE. Wear rate of vitamys remained at constant low level even using different head materials and diameters. [4]

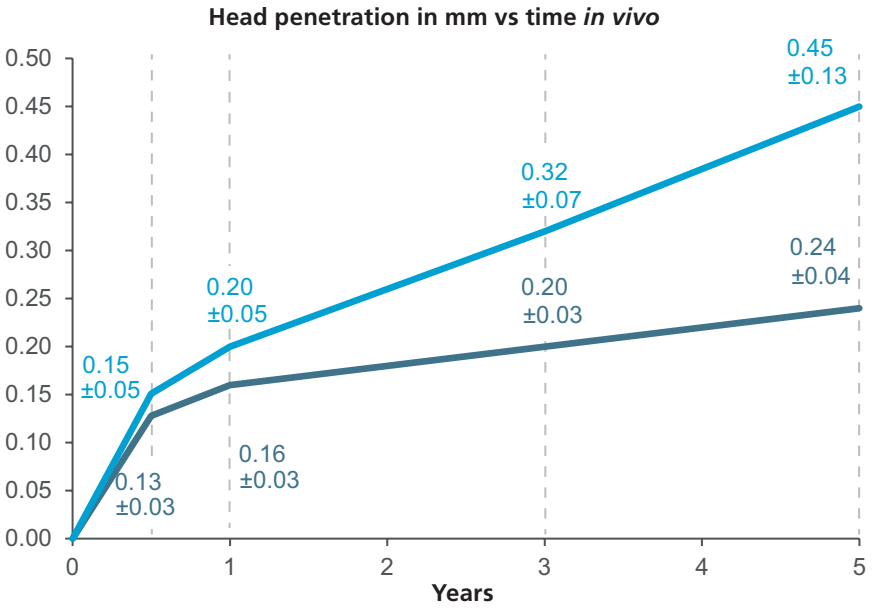
Wear rates of different material combinations
(Hip simulator test: 5 mio cycles) [38]



80 % reduction (*in vitro*) [38]
or 66 % (*in vivo*) [25] compared with standard UHMWPE

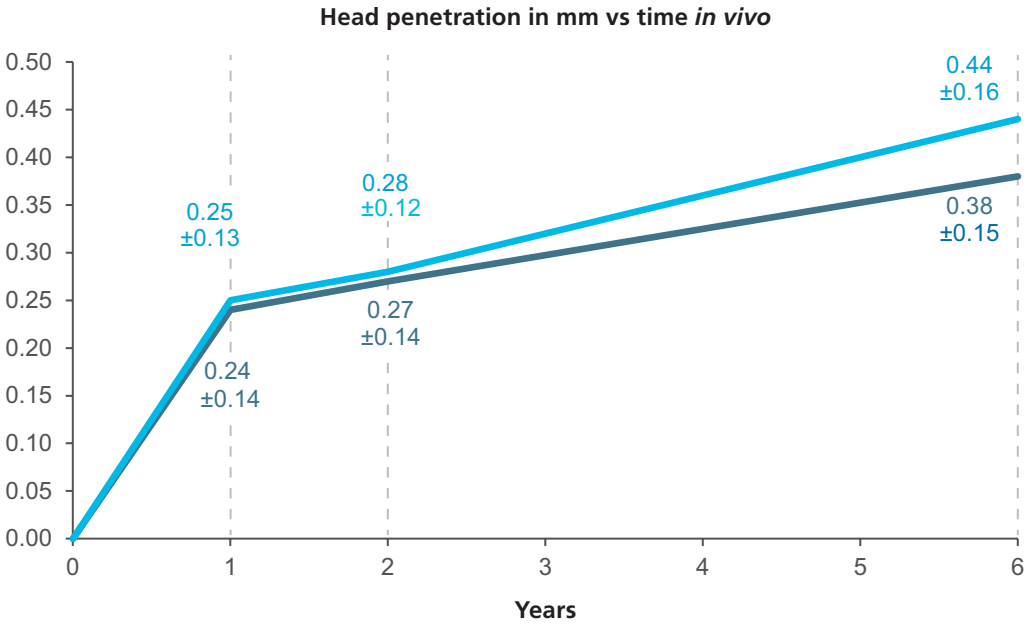
RM Pressfit vitamys – wear reduction *in vivo*

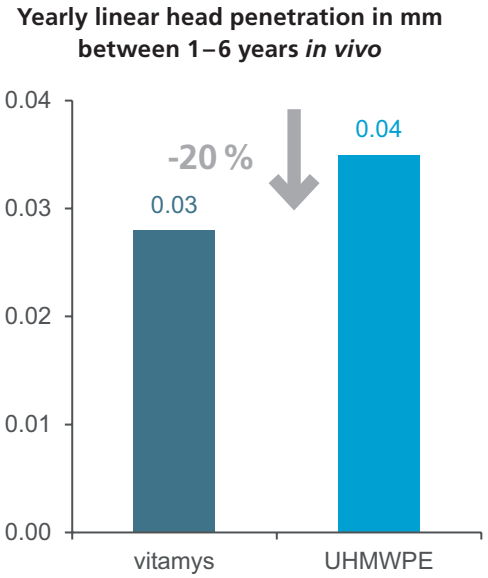
Five-year prospective, randomised data reveal lower wear rates for vitamys versus UHMWPE, suggesting effective prevention of osteolysis, implant loosening and revision surgery [24, 25] and confirms the positive results seen in the simulator studies.



«… this study confirms that HXLPE / VitE cups have the potential to prevent osteolysis, implant loosening, and eventually revision surgery in the future.» [25]

Six-year randomised controlled trial results show superior wear performance of RM Pressfit vitamys versus UHMWPE cups, with clinical and radiographic results similar to the UHMWPE cup. [39]





Several other clinical studies reported promising short and mid-term results as well. [10, 26, 27, 40, 41]

EFFICIENT

Mathys-typical straightforward instruments support an efficient workflow. The monobloc design of the RM Pressfit vitamys cup moreover allows minimisation of implant warehousing space despite a comprehensive size range.

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