# bonepreservation

**optimys – RM Pressfit vitamys – ceramys**

**Reconstructive, bone preserving & proven**

PRODUCT INFORMATION


CLIMAX
510
m/s
Descend

# Challenges in hip arthroplasty

With an increasingly elderly population as well as younger and more active patients, the need for artificial joint replacements is on the rise. As such, maximising the longevity and durability of implants – and emphasising bone preservation and biomechanics – has never been so important for both surgeon and patient. However, key challenges remain that need to be overcome in the future of total hip arthroplasty.

**Individual anatomy**

- Inability to tailor standard implants to a patient's anatomy and biomechanics
- Variations in femoral offset [1, 2]
- Challenges with joint stability and leg length with standard implants

**Bone and soft tissue preservation**

- Stress shielding
- Osteolysis
- Instability due to soft tissue malalignment and/or damage

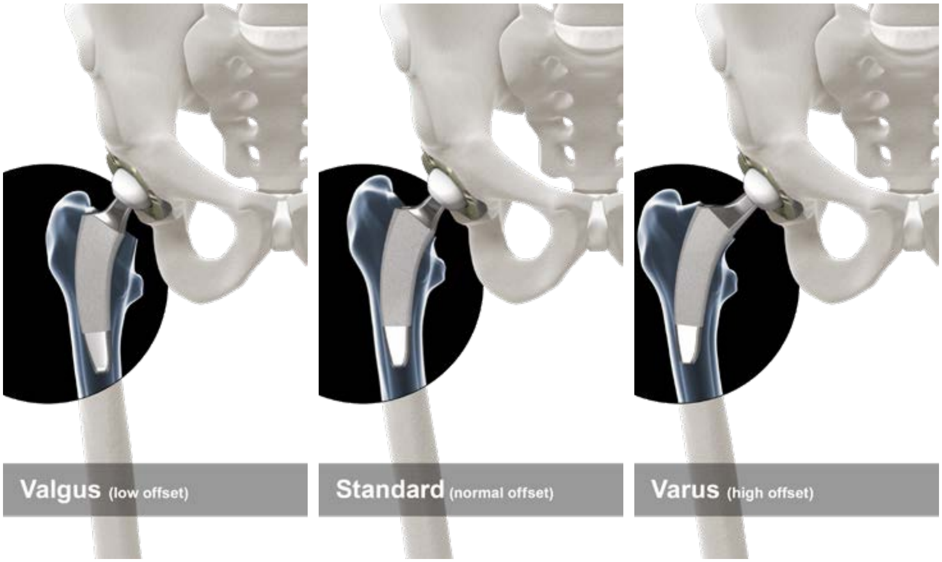
# optimys

The optimys hip stem is a cementless calcar guided stem designed to facilitate precise reconstruction of an individual's anatomy.

It meets the challenges of hip arthroplasty head-on with a number of key features.

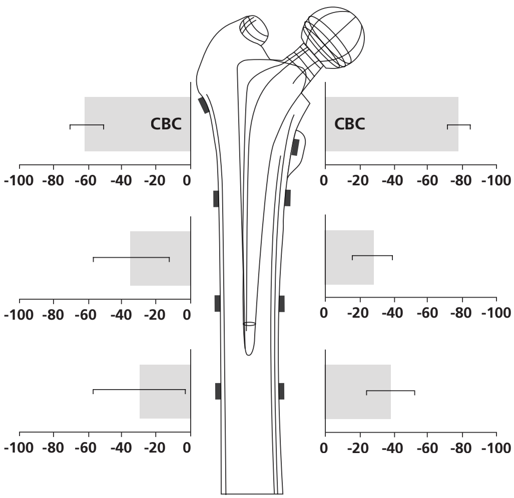
**Reconstruction of individual anatomy**

The stem can be aligned in standard, varus or valgus hips, restoring centre of rotation, offset and leg length [3, 4, 5] and offering accurate realisation of intended outcomes. [6, 7, 24]



# Bone preservation

Improved force distribution ensures a more physiological proximal femoral strain pattern of the optimys stem when compared to the Spotorno type stem (CBC), with reduced stress shielding in the proximal femur.[8]



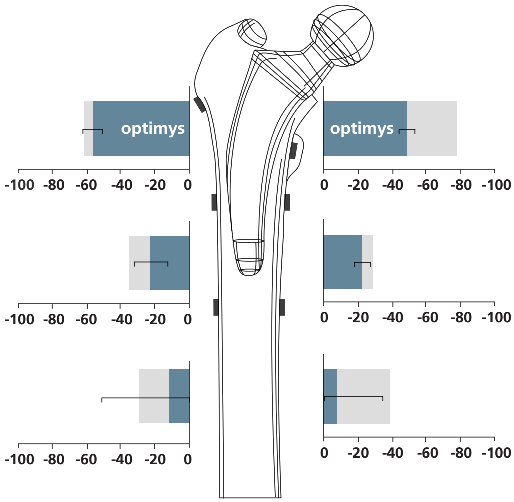
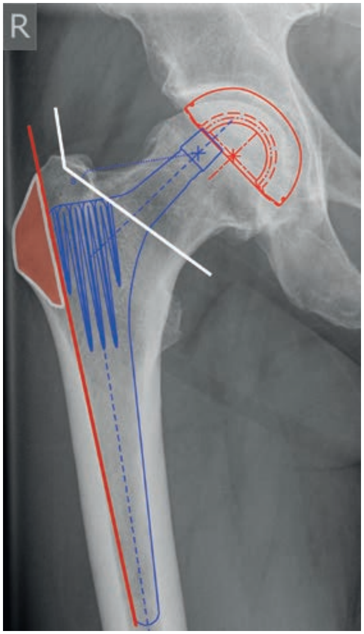




Illustration of the changes (percent) in cortical strains before and after implantation of the straight (CBC; left) and calcar guided (optimys; right) stems. Measurements were made at different points along the stems (black markers).

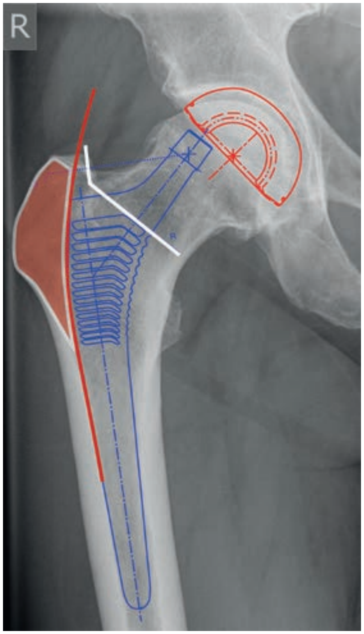
Image: Bieger R, et al.[8]

Curvature along the calcar is designed to fit to the anatomy of each individual, allowing safe and easy implantation and preservation of the greater trochanter. [9]

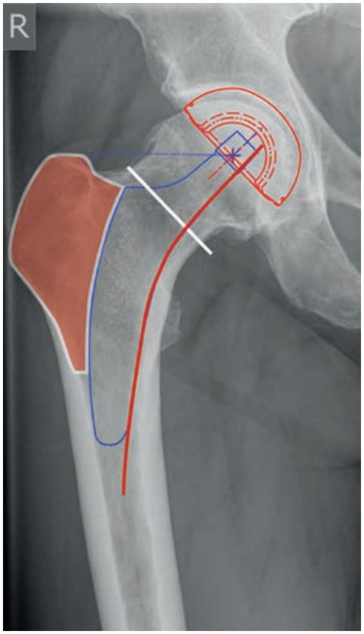
Spotorno type stem    Corail type stem    optimys stem




Spotorno type stem




Corail type stem




optimys

## Minimally invasive; tissue-sparing

With the aid of precise, flexible instrumentation to accommodate surgeons' preferences, various minimally invasive approaches can be used for optimys implantation. The calcar guided stem design of optimys facilitates a soft tissue-protecting and bone-saving technique, as well as reduced blood loss/blood transfusion compared with straight stems. [10]

## Bio-active coating

Two-layer, titanium plasma spray and calcium phosphate coating offers secure anchorage in the bone, and promotes rapid osseointegration for long-term secondary stability. [11]

## Clinical success

Promising mid-term results have been published in several studies (references can be found at www.bonepreservation.com).

# RM Pressfit cup

The RM Pressfit cup builds on Robert Mathys' isoelasticity concept originally incorporated into the RM Classic cup. Featuring a press-fit, cementless ultra-high-molecular-weight polyethylene (UHMWPE) monobloc design with titanium particle coating, it offers similar elastic properties to cancellous bone. [12] The resulting more physiological load distribution reduces the risk of acetabular stress shielding. [13, 14, 15]

**Long-term results**

Long-term results for the RM Classic and RM Pressfit have proven low revision rates and low rates of aseptic loosening, with 94.4 % and 98.8 % survival rates after 20 and 10 years, respectively. [16, 17]

# vitamys

The latest iteration of the RM Pressfit cup, the RM Pressfit vitamys features a highly crosslinked polyethylene stabilised via a vitamin E enrichment (VEPE), rather than heat treatment.

The RM Pressfit vitamys offers a highly oxidation-resistant, very low-wear bearing surface, virtually ruling out osteolysis. [18] It is the first cup of this type to combine low rigidity with high wear/ageing resistance.

**1967**

**Müller cemented**
The idea – design paradigms of a cemented cup

**1973**

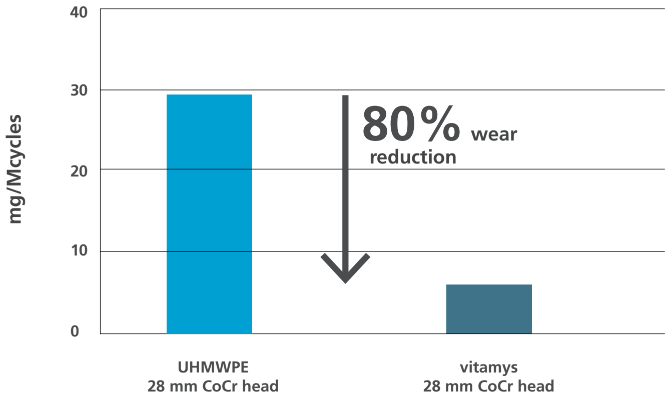
**RM uncoated**
The beginning – uncemented elastic monoblock design

**1983**

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

**Wear rates of different material combinations**

(Hip simulator test: 5 mio cycles, protein content 30 g/l)[18]




80 % reduction (*in vitro*)[18] or 66 % (*in vivo*)[19] compared with standard UHMWPE

## 2002

**RM Pressfit**

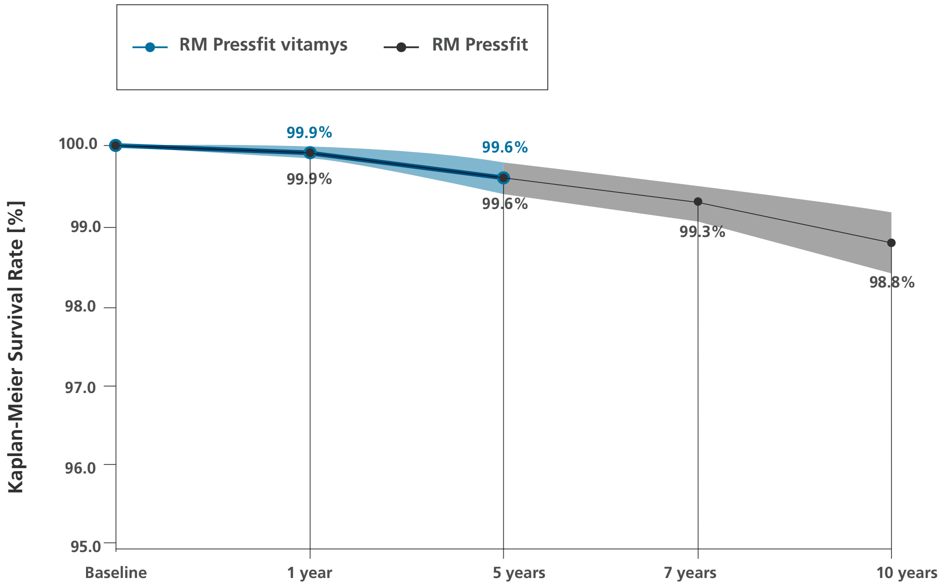
Portfolio expansion – Addressing customer needs

## 2009

**RM Pressfit vitamys**

vitamys – The E-factor makes the difference

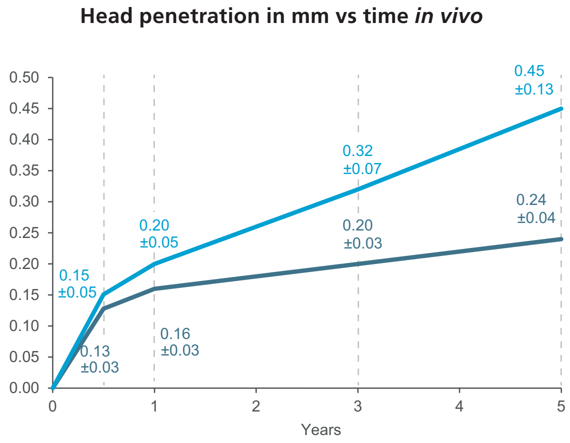
## High survival rates after 5 and 10 years




Survival Data from the NZ registry for the RM Pressfit and RM Pressfit vitamys have proven low revision rates and low rates of aseptic loosening, with 98.8% and 99.6% survival rates after 10 and 5 years, respectively. [17]

## Promising results

Five-year prospective, randomised data reveal lower wear rates for vitamys versus UHMWPE, suggesting effective prevention of osteolysis, implant loosening and revision surgery [19, 20] and confirms the positive results seen in the simulator studies.



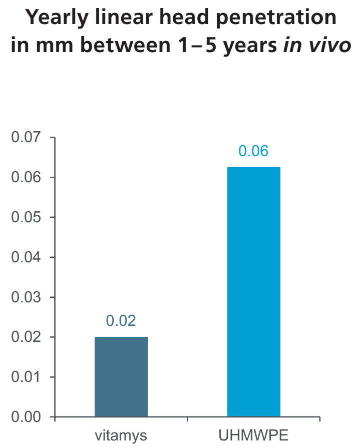




Image: Rochcongar G, et al. [19, 20]

# Elasticity

UHMWPE and vitamys as a material have an elasticity very similar to that of the human pelvic bone (Table 1) [18, 21].

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, peri-acetabular bone structures can be preserved in the long run, with low risk of stress shielding [22, 23].

| **Mechanical properties** | **UHMWPE (ISO 5834-2)** | **Bone** | **TiCP (ISO 5832-2)** |
|---|---|---|---|
| Density [g/cm$^3$] | 0.935 | 0.2–2 | 4.5 |
| Modulus of elasticity [N/mm$^2$] | 1 000 | 500–6 000 | 105 000 |
| Tensile strength [N/mm$^2$] | 25 | 8–150 | >400 |

**Table 1:** Comparison of the material properties of bone, UHMWPE and pure titanium [21]

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# Further reading

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***Preservation** in motion*

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