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move

a new way of thinking about everyday life in medicine and in the clinic

Interview with Dr Thomas Zumbrunn

«Unicondylar prostheses have resulted in good biomechanics even where there is cruciate ligament damage»



Preservation in motion

Something that lasts this long really must be good: **RM Pressfit vitamys**



From the professional field

Standing on your head is rarely the solution



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Dr Thomas Zumbrunn,

entrepreneur/ETH Zurich and independent knee consultant, worked as Senior Development Engineer at Mathys Ltd Bettlach until the end of April 2019. From 2015 to 2018 the bio-engineer and former Alpine skiing racer earned his doctorate at the ETH Zurich, where he led the study on unicompartmental knee arthroplasty (UKA) in patients with alternative implant indications and modified surgical protocols. Prior to this, Dr Zumbrunn worked as a research consultant at the Massachusetts General Hospital (Boston, USA) supporting teams of scientists, engineers and clinicians in the development of knee and hip endoprostheses in collaboration with industry.

Unicondylar knee replacements are only rarely used, even though they are functionally

superior to a total knee replacement. Dr Zumbrunn at the ETH Zurich has investigated

the extent to which patients with ACL insufficiency benefit from a partial prosthesis.

Dr Zumbrunn, what is the focus of your study?

We know that unicondylar knee replacements are superior to total knee replacements in terms of kinematics. Nevertheless, total knee implants are used in over 90% of cases. Most orthopaedic surgeons view insufficiency of the anterior cruciate ligament (ACL) as a contraindication to unicompartmental knee arthroplasty (UKA). We put forward the hypothesis that, if ACL insufficiency is present, an appropriately modified positioning of a unicondylar prosthesis can still achieve kinematics that are comparable with those of a conventional UKA with an intact ACL. thesis. However, the prosthesis was inserted with reduced tibial inclination in order to compensate for the cruciate ligament's impaired function. We then investigated the dynamic function of the knee joint in various everyday activities such as walking, stair climbing, knee bending, etc., and compared the results of the two UKA groups.

What do you feel is the most important finding from the study?

The most important finding was that unicondylar knee prostheses result in good biomechanics in the knee joint even when there was cruciate ligament damage. In particular, we were able to demonstrate rotational and trans-



To demonstrate this, we compared patients with an intact cruciate ligament who had undergone conventional UKA surgery with patients who had a damaged cruciate ligament and who received the same unicondylar proslational ranges of movements similar to those in conventional UKA patients. These ranges are greater than with a total knee replacement. This presents the opportunity to afford patients satisfactory proprioception with less invasive

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Digital dynamometer

Instead of relying on subjective impressions during manual muscle testing, doctors can objectively assess patients' muscle strength using the «ActivForce» digital dynamometer.



The «activ5» device that goes with it fits in the palm of the hand and can be used for most muscle groups. Changes in strength, for instance, can be measured before and after surgery, the symmetry of the left and right sides determined, the stamina of certain muscle groups tested, or the maximum muscle strength measured and tracked over time. The data is displayed in real time on a smartphone or tablet via Bluetooth and can be stored and analysed individually for each patient. This allows improvement in performance to be monitored postoperatively and during rehabilitation can be used to encourage further exercise.

The device can be purchased via the California manufacturer's website at <u>ht-tps://www.activ5.com/activforce/</u>. The ActivForce app is available free of charge from the App Store or Google Play Store.

treatment. Whether this method will bring long-term clinical success, however, is something that long-term studies have yet to confirm.

Why do you think that the unicondylar joint replacement is becoming increasingly important in orthopaedics?

The reason is that a unicondylar joint replacement generally allows improved proprioception and mobility to be achieved, especially during sporting activities. Unicondylar implants also carry a lower risk of infection, and rehabilitation is faster since the operation is less invasive than a total knee replacement. Increasing numbers of younger patients still want to actively engage in sports; for them, everyday activities alone are not enough. Unicompartmental knee arthroplasty also allows further options for later revision due to the extensive preservation of bone stock.

«The most important finding is that unicondylar knee prostheses result in good movement patterns in the knee joint even if there is cruciate ligament damage.»

What does this trend mean for manufacturers, orthopaedic surgeons and patients?

The market for partial knee replacements will continue to grow, so manufacturers will hopefully push ahead with the development of new implants and surgical techniques in this field. Patients are increasingly asking orthopaedic surgeons to carry out procedures that are as minimally invasive as possible, and the unicondylar prosthesis offers this option. This does mean, however, that the surgeon needs to implant unicompartmental prostheses regularly in order to achieve the requisite familiarity with the technique. After all, an increase in case numbers has a positive effect on survival rate. It has also been suggested that unicondylar prostheses are indicated for up to 50% of the patient population; based on current case numbers, however, they are only used in just under 10% of cases.

«Increasing numbers of younger patients still want to actively engage in sports; for them, everyday activities alone are not enough.»

What influence do you think technological developments such as robotics, patientspecific implants, joint replacements produced on 3D printers, etc., are having on knee-replacement surgery in general?

For unicondylar prostheses especially, computer-aided systems can reduce the frequency of outliers, such as the number of cases that fall outside a pre-operatively defined safe region. There is no proof to suggest that patientspecific implants result in an improvement. Using the implants correctly and consistently, however, is the key. It may be that robotics can help with this, however they are associated with significantly higher financial cost, which would put a further burden on the healthcare system. In theory, orthopaedic surgeons with small case numbers could benefit from robotics, but in practical terms they probably won't have access to these systems. I regard the use of 3D printing for joint implants as being unrealistic at the moment, although there are certainly useful applications for creating surgical instruments with it. Ultimately, the most important thing is to offer a reliable and reproducible surgical technique, no matter which tools one uses.

Dr Zumbrunn, thank you for talking to us today!

PRESERVATION IN MOTION

Something that lasts this long really must be good: RM Pressfit vitamys

The RM Pressfit vitamys cup will soon have been on the market for 10 years. The world's first cementless, elastic monoblock cup made with vitamin E combines the advantages of its tried-and-tested predecessors, the RM Classic cup and the RM Pressfit cup, with the excellent material properties of vitamys.

The vitamin E-stabilised, highly cross-linked polyethylene (VEPE) significantly reduces the oxidation and ageing of the polymer.^{1,2}

Tried-and-tested design

The primary stability of this implant is achieved through an equatorial pressfit. The compressive forces are guided peripherally towards the cup's equator thanks to the flattening in the polar region.³ This means that the load transfer can be approximated to that of the natural hip joint.⁴ The design is based on the clinical evidence from the RM Classic and RM Pressfit monoblock cups.^{5–8}

Bone-like elasticity



Secondary stability is achieved through rapid bone integration. The special titanium-particle coating on the cup surface creates a microstructure that encourages bone growth.^{7,8}

The elasticity of the implant is very similar to that of the surrounding bone.^{7,9,10} These isoelastic material properties help to ensure longterm preservation of the bone morphology. For this reason, the RM Pressfit vitamys cup represents a central component in the bone preservation system (www.bonepreservation.com).

Notable material properties

Compared to conventional, ultra-high-molecular-weight polyethylene (UHMWPE), vitamys has 80 % (*in vitro*) or 65 % (*in vivo*) lower wear rates.^{11, 12} The material properties of VEPE allow for a reduced wall thickness, which means that larger heads can be used with smaller cup diameters: With a cup size of 48 mm or larger, a 32 mm articulation is possible, while a cup size of 50 mm or larger allows an articulation of 36 mm.



The RM Pressfit vitamys cup has a 7A* rating from the Orthopaedic Data Evaluation Panel (ODEP). The current ODEP ratings can be found at www.odep.org.uk.

Preservation in motion



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FROM THE PROFESSIONAL FIELD



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Standing on your head is rarely the solution

Your own viewpoint and opinions are important; however, they can limit your perspective, preventing problems and obvious solutions from being recognised. A change of perspective can produce astonishing results.

In a study carried out in 2006 by researchers at Johns Hopkins University, surgical teams at 60 hospitals were surveyed about their perception of teamwork, communication and leadership in the operating theatre.¹ Around 87 per cent of surgeons rated the communication and cooperation with theatre nursing personnel as good or very good, but only 48 per cent of theatre nurses and assistants gave the surgeons the same rating.1 The researchers were surprised at how different the impressions were - almost as though the nurses and surgeons were not working on the same team. Clearly, both sides had different views on what constitutes good collaboration in the operating theatre. For the surgeons, it was crucial that the nursing staff know in advance what was needed and that they follow instructions. For the nurses, it was important that the contribution they were making during an operation be recognised and respected.¹

Question your own self-image

Both perspectives are justified. What matters, however, is the difference between your own self-image and how others see you. If different expectations and perspectives lead to misunderstandings, then patient safety can be compromised. Studies have actually been able to demonstrate that good, team-focused behaviour increases patient safety.¹⁻³ This means that team members must trust each other and also give the surgeon critical feedback. Only a change of perspective allows you to put yourself in the shoes of your team members and at the same time learn something about yourself and the way you come across to people. Openness to the needs of others, empathy and self-criticism are all essential qualities.

Find solutions more easily

Another reason for departing from familiar thinking patterns is the opportunity to solve problems. With some questions and challenges, it's literally impossible to see the proverbial wood for the trees, for example, when it comes to diagnosis: the more laboratory readings and parameters that are collected, the more questions they can raise. Even everyday routines can prevent us from recognising an obvious solution. Waiting areas in the hospital might look different, for example, if we were able to see them through the eyes of waiting patients. In such situations, it's useful also be crucial in negotiations.⁵ Anyone trying to convince colleagues or superiors of a new idea will be able to argue their beliefs more convincingly if they understand the other party's position and motivation. This means that the person you are trying to convince



to gain distance, re-think familiar ideas, question what we accept and be open to changes. Studies have also shown that people who are easily able to imagine the world through other people's eyes are also better at empathy.⁴

Be a better negotiator

The ability to view the world from another person's perspective is a social skill that can

may discover the benefit for themselves, or by working together you reach may completely new, even better solutions.

In the most famous scene in the film «Dead Poets' Society», literature teacher John Keating (Robin Williams) climbs onto a desk to demonstrate a change of perspective and explains to his students, *«Just when you think*



you know something, you have to look at in another way. Even though it may seem silly or wrong, you must try.»

You don't always have to climb onto a desk to see the world from a different angle. And standing on your head doesn't often help much, either. What's much more important is to break through well-worn routines, bravely face new challenges and meet people with empathy and free from prejudice. If you dare to change your perspective, your life can change and the rewards can be greater room to manoeuvre and broader horizons.

Our checklist featuring the «7 top tips for seeing the world through different eyes», which will help you learn how to change your point of view in everyday situations, is available for you to download.

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Download

The checklist containing the «7 top tips for seeing the world through different eyes» is available for you to download



Further reading

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Kevin Paul Scott

The Lens of Leadership: Nine Strategic Shifts in Perspective. Baxter Press, 2018

Kimberly White

The Shift: How Seeing People as **People Changes Everything.** Berrett-Koehler Publishers; 2018

Theo Koffler

RETHINK Card Deck Mindful Conversation Starters: 56 Questions to Encourage Compassion, Shift **Perspective & Build Connection.** PESI Publishing & Media, 2017

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