MATHYS
European Orthopaedics

NOVEMBER 2018

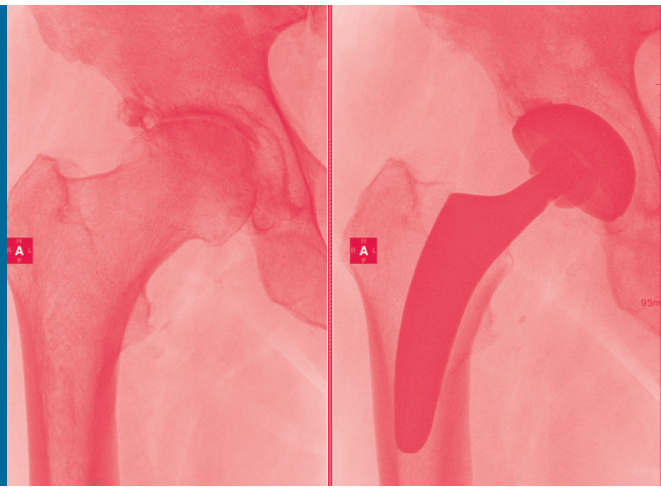
move! 92

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

STIMULI FROM ORTHOPAEDICS AND THE PROFESSIONAL FIELD – FOR PHYSICIANS, SPECIALISTS AND EXECUTIVES

Focus on science

Stems in a valgus orientation: Long-term monitoring recommended



Preservation in motion

balanSys BICONDYLAR – It's a PLUS

From the professional field

Resilience – what makes hospital staff strong

Stems in a valgus orientation: Long-term monitoring recommended

By Dr Karl Philipp Kutzner, Consultant and Specialist in Orthopaedics and Trauma Surgery at St. Josef's Hospital in Wiesbaden, Germany

A retrospective study examined the consequences of various stem positions of the optimys short-stem prosthesis over a period of 2 years.

The short-term clinical results are promising.

Calcar-guided short stems represent a separate design class and belong to the family of femoral neck part-preserving short stems. The potential advantages of these types of stem, compared with alternative designs, can be harnessed through a special implantation technique that differs from conventional methods.

As the implants are inserted, they follow the patient's anatomy along the calcar, allowing customised positioning. The position of the stem in the proximal femur depends on the level at which the femoral neck is resected, the planning of which varies. With varus anatomy, a high resection can lead to a varus position of the implant. With valgus anatomy, however, a low resection will lead to a valgus position. This allows the customised reconstruction of a broad range of CCD angles with the goal of achieving precise preservation of the hip geometry (Fig. 1).

Study on the impact of marked varus / valgus alignment

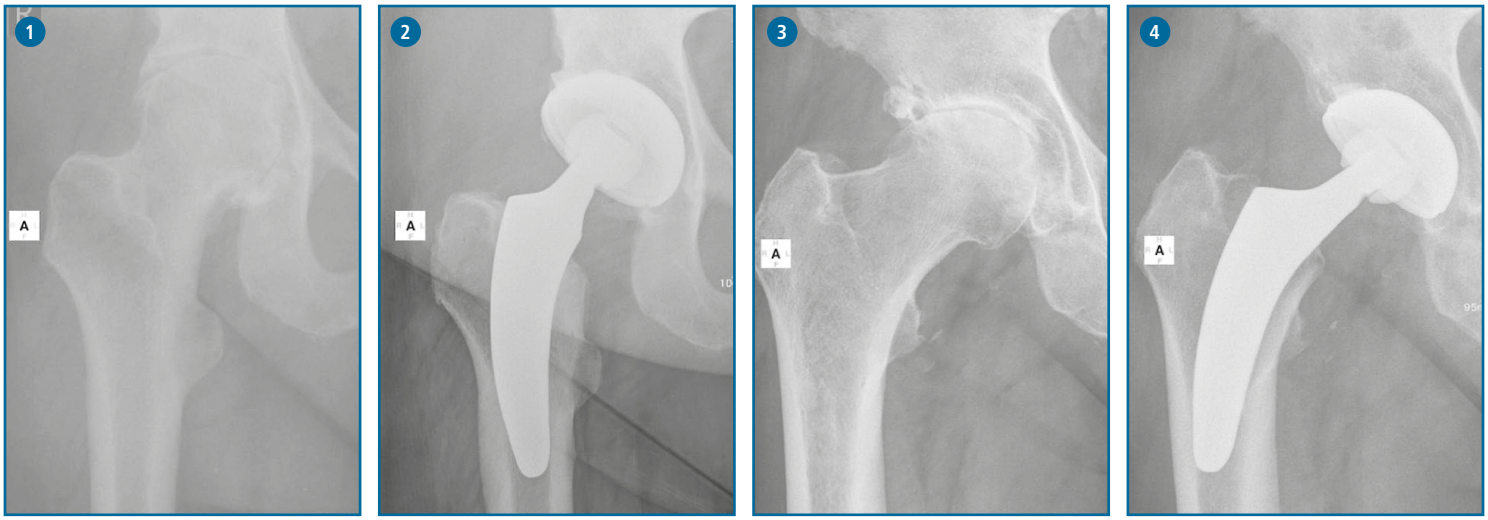
As part of a retrospective study at St. Josef's Hospital in Wiesbaden, Germany, the consequences of various stem positionings with a calcar-guided short stem prosthesis (optimys, Mathys Ltd Bettlach) were examined over a period of two years using EBRA-FCA method (femoral component analysis using «Einzel-Bild-Röntgen-Analyse»). The study focused on the post-operative impact of marked varus/valgus orientation on the axial distal migration of the short-stem total hip endoprosthesis. Stress shielding and the occurrence of cortical hypertrophy were also investigated in the same context. The clinical outcome was evaluated using the Harris Hip Score (HHS).

This study investigated 216 total endoprostheses (TEP) of the hip in 162 patients with an average age of 63.0 years. All of the operations were carried out using a minimally invasive anterolateral approach. In all cases, full weight bearing using two crutches was permitted immediately after the operation. The analysis was carried out by dividing the patients into five groups based on their post-operative CCD angle
(A: < 124.9°; B: 125° – 129.9°; C: 130° – 134.9°, D: 135° – 139.9°; E: > 140°).

Results after 2 years of follow-up

After two years, the average varus / valgus angulation for Group A was: -0.16°, B: 0.37°, C: 0.48°, D: 0.01° and E: 0.86° (p = 0.502). The mean axial stem migration after two years in the groups was A: 1.20 mm, B: 1.02 mm, C: 1.44 mm, D: 1.50 mm and E: 2.62 mm. While extensive varus positioning did not indicate any increased distal migration, the vertical position of the stem changed post-operatively when the positions were markedly valgus (Group E).

Fig. 1 *A broad spectrum of CCD angles with marked varus and valgus positions can be reconstructed with these types of stems. Marked valgus position (pre-operative **(1)**, right 2-year follow-up **(2)**); marked varus position (pre-operative **(3)**, 2-year follow-up **(4)**).*



Age and weight also had an influence on the axial migration (0.26 mm more distal migration per age difference of 10 years and 0.13 mm more distal migration per weight increase of 10 kg). In terms of stress shielding, the occurrence of cortical hypertrophy and the results evaluated with the HHS, there were no differences between the groups. Periprosthetic fractures did not occur in any of the groups, and no revisions of the hip stems were reported.

One of the main reasons for increased axial instability in valgus positions was determined to be undersizing the stem during the operation. Primary stabilisation is impaired as a result of a lack of cortical contact, especially laterally (Fig. 2). This is critical with stems that are implanted in a valgus position and should always be checked during surgery.

Promising short-term results

The results confirm that a broad spectrum of CCD angles can be adequately reconstructed with a calcar-guided short stem. Significant femoral varus alignments do not lead to any increased instability, either in terms of varus or valgus migration or distal migration behaviour, which avoids any limitation of the indications in this context. Marked valgus positions are associated with initial distal migration, however there are no clinical sequelae after 2 years. All in all, stress shielding and the formation of cortical hypertrophy are minimal and also without clinical sequelae. The short-term clinical results are encouraging in all groups. Further monitoring, especially focusing on valgus hips, is recommended. Undersizing the stem, particularly in the context of valgus positioning, should be avoided.

Summary

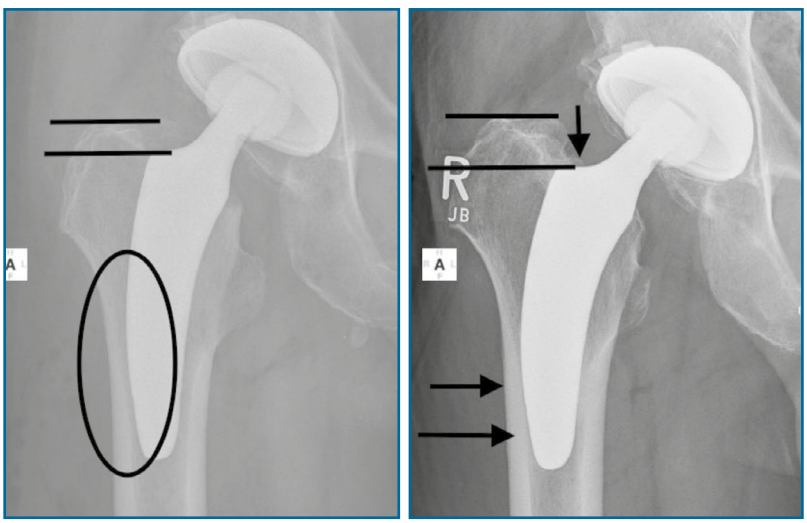
The careful and skilful use of a calcar-guided short stem in hip endoprosthetics permits reliable and customised reconstruction of the patient's anatomy without increased clinical risk.

Further information about the optimys stem and the Bonepreservation system can be found at www.bonepreservation.com.

References

Kutzner KP, Freitag T, Donner S, Kovacevic MP, Bieger R. Outcome of extensive varus and valgus stem alignment in short-stem THA: clinical and radiological analysis using EBRA-FCA. Arch Orthop Trauma Surg. 2017; 137(3): 431–439.

Fig. 2 *Undesizing the stem, together with inadequate lateral cortical contact, can encourage initial instability as a result of subsequent implant micro-movements, especially in valgus hips.*



balanSys BICONDYLAR – It's a PLUS
The knee system with added value

Find out what PLUS points this well-tested knee prosthesis can offer in terms of satisfying surgeons' high expectations regarding system, reliability, ergonomics, stability and functionality.

20 years of clinical experience and exceptionally low revision rates speak volumes for the balanSys BICONDYLAR[1] – today more than ever! This knee system provides clinical reliability with a survival rate of 97.0 % after 12.4 years and scores highly in terms of patient satisfaction.[1]

Building on its tried-and-tested implant design, Mathys is continually pushing ahead with the development of the balanSys BICONDYLAR knee system. The expectations in terms of stability, precision, enhanced technology and longevity are brought together and continued in balanSys BICONDYLAR PLUS: www.balanSysPLUS.com.

This well-tested prosthesis now comes with additional PLUS points to offer the surgeon real added value in the operating theatre:

+ leggera Instruments
The leggera instruments are based on the three principles of intuitiveness, efficiency and ease of use. As a result, the processes involved in implanting the balanSys BICONDYLAR prosthesis are made simpler.

+ vitamys Inlays
vitamys is a vitamin E-enriched, highly cross-linked polyethylene designed for maximum resilience and a long lifespan. This well-tested material features: • Excellent mechanical properties • High wear resistance • High oxidation resistance • High ageing resistance.

The addition of the natural antioxidant vitamin E means that vitamys is highly resistant to oxidation. This preserves its excellent mechanical and tribological properties even after long periods of use.[2]

+ Refined height increments of vitamys inlays
Precise balancing settings of the flexion and extension gap help surgeons establish natural ligament tension. The result? Superb stability throughout the entire range of movement. With refined height increments, the surgeon gains intra-operative flexibility and can fine-tune the stability with just a few adjustments before completing the procedure.

Sources

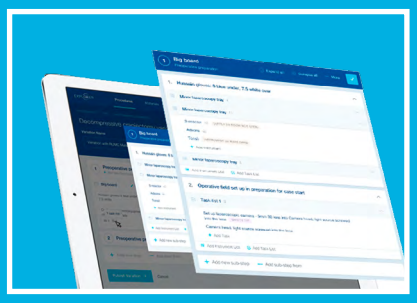
[1] Heesterbeek PJC. Superior long-term survival for fixed bearing compared with mobile bearing in ligament-balanced total knee arthroplasty. Knee Surg Sports Traumatol Arthrosc. 2018;26(5):1524-1531.

[2] Data on file at Mathys Ltd Bettlach.

Preservation in motion

Perfecting workflow in the operating theatre

Operations are complex processes involving numerous people, as well as dozens of implements and instruments. Every single one of these components has a role to play and must follow specific sequences. «ExplORer Surgical» has been developed to help operating theatre teams work together more efficiently.



The software acts like a digital guide, helping the theatre team navigate its way through complex interventions. ExplORer Surgical creates customised «workflows», which map each individual step for each member of the theatre team. This means that misunderstandings, missed steps and the unnecessary use of disposable items can be avoided, while errors or delays can be minimised. ExplORer Surgical also offers users real-time performance and planning data in order to improve the quality of care and its efficiency. The software can be used both in training and in practice, and currently focuses on cardiology, orthopaedic and robot-assisted procedures.

You can find out more about ExplORer Surgical at: http://explorersurgical.com

Resilience – what makes hospital staff strong

High workloads, constant time and performance pressures and tragic experiences with patients put hospital staff at a high risk of burn-out. Consequences range from frustration and poor performance to time off sick and an increase in errors, as well as the premature ending of careers.[2,3] More than half of orthopaedic surgeons display at least one symptom of burn-out, the most common one being emotional exhaustion.[3,4]

But not everyone who has to manage stress or crises gets ill from it. Some employees appear to be immune to the stresses of everyday clinical practice. In fact, they even emerge from crises stronger. So what sets these people apart? Where does their mental resilience come from?

The term resilience comes from the Latin «resilire», which means «to rebound» or «to bounce back», and refers to the preservation or rapid restoration of mental health during or after stressful life circumstances.[5] This ability is even reflected in metabolism. In particularly resilient people, the level of stress hormones normalises faster after an incident.[6] As a result, resilient people are not only able to recover from stress more quickly but tend to get used to it.[6] The reward system in the brain appears to play an important role in this.

Research into psychological defences

The pioneers of resilience research were the psychologists Emmy E. Werner and Ruth S. Smith. For almost 40 years, they observed the development of children who had been born in 1955 on the Hawaiian island of Kauai and who, in some cases, had grown up in difficult circumstances.[7] At the time, it was assumed that a difficult childhood virtually predestined these individuals to fail later in life. However, the «Kauai studies», as they became known, show that a third of the children, despite their difficult starts in life, grew up to become adults capable of coping with life.[7] These results indicate that psychological protection factors must be at play.

Nowadays, it is believed that resilience is governed 50 % by internal factors (genetics, cognitive and emotional resources, etc.) and 50 % by external factors (e. g. social resources).[5,8]

Protective and resilience factors

The crucial protective factors, which are also referred to as the pillars of resilience, include, among others, the following behaviours, attitudes and abilities:[5,6,9]

1. Access to a functioning social network (social support).
2. The belief that things will turn out alright, and that every crisis harbours something positive (realistic optimism).
3. The ability to reassess their own experiences and perspectives and to adapt flexibly to changed conditions (cognitive flexibility).
4. Active management of stress and crises, for example by seeking support from others or by promoting physical fitness (active coping).
5. The ability to put themselves in the psychological and emotional position of another person and a tendency to help other people (empathy).
6. The confidence to change things through their own actions and to manage difficult situations on their own initiative (conviction in self-efficacy).
7. The ability to work in a disciplined manner, even under pressure, and to not feel overwhelmed by their own emotions (impulse control).

These factors vary from individual to individual and are never all present or present at all times. However, resilience researchers are convinced that:

Resilience can be learned

At the German Resilience Centre (DZR)[10], which was the first institution of its kind in Europe and which opened its doors in 2014, over 80 researchers are seeking to solve the puzzle of internal resilience and develop training courses to help encourage it. There are already numerous programmes that are being used to boost resilience, including in the healthcare sector.

Two examples of free online resilience training courses for doctors and hospital staff:

- The portal of the American Medical Association (AMA) offers a free online module to help doctors improve their resilience with the option to download a toolkit.
- An article by DZR researchers on «Resilience: Protective mechanisms against burn-out and depression», which was offered in conjunction with the Bavaria Medical Association as further training.

Studies illustrate that strengthening your own

Download

The resilience checklist can be found here to Download

resilience and that of your team is a worthwhile endeavour: resilient staff are better equipped to face the numerous challenges of medical training and patient care, and therefore have a lower risk of burn-out. [11] Encouraging resilience consequently benefits the patient and the hospital as a whole.

Our checklist, which is available for you to download, tells you how you as a manager can strengthen your employees› resilience.

Sources

[1] West CP, Huschka MM, Novotny PJ, et al. Association of perceived medical errors with resident distress and empathy: a prospective longitudinal study. JAMA. 2006;296(9):1071-8.

[2] Shanafelt TD, Balch CM, Bechamps GJ, et al. Burnout and career satisfaction among American surgeons. Ann Surg. 2009;250(3):463-71.

[3] Arora M1, Diwan AD, Harris IA. Burnout in orthopaedic surgeons: a review. ANZ J Surg. 2013 Jul;83(7-8):512-5.

[4] Shanafelt TD, Hasan O, Dyrbye LN, et al. Changes in burnout and satisfaction with work-life balance in physicians and the general US working population between 2011 and 2014. Mayo Clin Proc. 2015;90:1600-13.

[5] Kunzler AM, Gilan DA, Tüscher O, Lieb K. Aktuelle Konzepte der Resilienzforschung. Nervenarzt. 2018;89:747.

[6] Strahler J. Was die Psyche wachsen lässt. Gehirn & Geist 2017; 11:13-7.

[7] Werner EE, Smith RS. Overcoming the Odds: High risk children from birth to adulthood. Cornell University Press; 1st ed., 1992.

[8] Amstadter AB, Myers JM, Kendler KS. Psychiatric resilience: longitudinal twin study. Br J Psychiatry. 2014;205(4):275-80.

[9] Helmreich I, Kunzler A, Lieb K. Die Widerstandskraft stärken. Physiopraxis. 2018;4:48-51.

[10] https://www.german-resilience-center.uni-mainz.de Access at 24.07.18.

[11] Tregoning C, Remington S, Agius S. Facing change: Developing resilience for staff, associate specialist, and specialty doctors. BMJ 2014;348:g251.

Further reading

Chambers C, Ryder E.
Supporting Compassionate Healthcare Practice: Understanding the Role of Resilience, Positivity and Wellbeing
Routledge, 2018.

Duckworth A.
Grit: Why passion and resilience are the secrets to success
Vermilion, 2017.

Edmonstone J.
Personal Resilience for Healthcare Staff
Routledge, 1st edition 2013.

Masthead

Publisher:
Mathys Ltd Bettlach • Robert Mathys Strasse 5 • 2544 Bettlach • Switzerland
Telephone: +41 32 644 1 485 • E-mail: move@mathysmedical.com
Editor responsible for the magazine:
Tanja Rölli • Head of Market Communcation & Congresses • Mathys Ltd Bettlach

move! is published by Mathys Ltd Bettlach – your competent partner for total arthroplasty. With new, useful information, *move!* is addressed to specialists in orthopaedics and traumatology in hospitals and practices, as well as all specialist and management staff in the medical field, nursing staff and general management in hospitals. We would like to thank all of those who have helped us in realising the publication of *move!* by making individual contributions, or providing information and photographs.