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

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«I prefer evolution to revolution»

Mathys developer Frank Dallmann approached the development of the Affinis Inverse shoulder prosthesis with the greatest respect. Rather than doing everything differently, he decided to use a step-by-step optimization of the classic Grammont design.

Frank Dallmann, Dipl.-Ing.

is Head of Shoulder Development at Mathys Ltd in Bettlach, Switzerland. The design and product development engineer started his career at Robert Bosch GmbH and has worked at Mathys in Bettlach (Switzerland) and Mörsdorf (Germany) for nearly 20 years.

Mr. Dallmann, the Affinis Inverse shoulder prosthesis addresses the problems with the Grammont. How did you go about developing it?

We developed the prosthesis between 2005 and 2007, initially by drawing on the experience of doctors using the Grammont prosthesis and on literature from the early 2000s, including Boileau et al., 2006 [1]. At that time, we identified its weaknesses; these were reconfirmed in 2011 and 2016 in publications by Zumstein and Favard [2, 3]. The reduction in revision rates to 9.75 % after ≥5 years with the Grammont system [3] in comparison to the average of all available systems (10.1 % after ≥2 years) [2] confirmed the progress made in inverse shoulder arthroplasty .

«We have almost 12 years of clinical experience and the first patients have already gone through a 10-year follow-up.»

Our goal was to retain the positive aspects of the product design and minimise problematic features in a process of evolution.

What were the specific challenges relating to the original Grammont design?

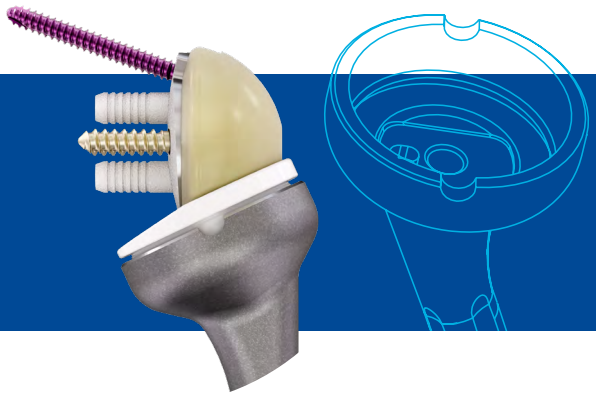
We were able to identify four areas: Firstly, the polyethylene humerus inlay caused progressive PE-induced osteolysis due to PE bone abrasion on the scapular neck. Secondly, the inferior screw resulted in implant-to-implant contact with the inlay. Thirdly, we detected increased rates of periprosthetic fractures, loosening and disconnections in the modular stems. Finally, we focused on the complex metaglene glenosphere design, which consisted of many individual parts and cavities thus promoting disconnections and infections.

How important is the aspect of notching – and how does it affect patients?

We've always believed that these massive PE-induced osteolyses behind the baseplate of the glenoid lead to clinical complications. That's why we wanted to eliminate this problem. Optimal inferior positioning of the glenosphere is not always possible, resulting in PE abrasion on the scapular neck or triceps. Even with a newer system with a lateralised onlay stem, 145° inclination and PE onlay, an inferior notching rate of 10.1 % was observed after at least two years in one 2017 publication [4].

«Overall, we've succeeded in achieving evolution through innovation.»

In contrast to earlier statements that notching is primarily a radiological phenomenon, this



working group found that patients with notching had significantly worse clinical outcomes and significantly higher revision rates. If as many as 10 in 100 patients are doing badly, then this cannot be the standard we're looking for in prosthetic development.

You mentioned the inferior screw as being the weak point in the Grammont design. Where does the problem lie exactly?

The inferior cortical screw has its effect in the subchondral bone of the scapular neck, i. e. it is positioned as inferiorly and as obliquely as possible. However, this leads to systematic

implant-to-implant contact with the inlay and results in PE abrasion and may even cause metallosis and screw breakage. For this reason, the inferior screw was increasingly inserted parallel to the peg, but as a result was often placed in the cancellous bone, thus losing its function.

What other aspects influenced the design of the Affinis Inverse?

Aside from the fact that modular stems lead to an increase in periprosthetic fractures, loosening rates and disconnections, it was particularly important to pay attention to the complex metaglene-glenosphere structure. In the Grammont design this construct, with its large number of individual components and cavities, made cleaning, sterilisation and assembly both difficult and time-consuming. According to Molé et al. [5], the observed infection rate was four times higher in comparison to anatomical TSA procedures.

How did you address the problems you describe during the development of the Affinis Inverse?

Reversing the material pairing with a «hard» inlay in the humerus eliminates PE friction against the bone. We replaced the inferior screw with a second pressfit peg and introduced monolithic pressfit stems. We have greatly simplified the design of the metaglene glenosphere structure and reduced the cavities in the design.

«Our goal was to retain the positive aspects of the product design and optimize problematic features in terms of an evolution.»

The glenosphere was not lateralized, but the centre of rotation in the implant-bone plane was retained so as not to increase shear forces. In addition, the inlay was bevelled – and the now often-discussed average inclination of 147° was transferred to the inlay – which meant that the notching-free range of motion could be increased again. Overall, we've succeeded in achieving evolution through innovation.

What do you mean by «evolution»?

In endoprosthetics, we have a decades-long process of experience-gathering and optimization behind us. In this multifactorial interplay of soft tissues, bones and prostheses, it's impossible to predict all the consequences of changes, even when using state-of-the-art simulation methods. That's why we must respect our predecessors and their positive experiences. We should record this data and make stepwise changes to parameters that have proven to be problematic. In this respect, I prefer evolution to revolution.

Has the Affinis Inverse proven itself yet?

Yes. We have almost 12 years of clinical experience and the first patients have already completed a 10-year follow-up. The results show a low revision rate of 4.7 % after 2 years [6] when compared to data from other studies [2, 3, 4]. With 358 patients now mostly aged over 80 years (mean age at surgery of 74.1 years) being included in the ongoing multicenter trial, it's hard work for the clinics involved in the trial to complete the follow-up. We're working on publishing the excellent long-term results as soon as possible.

Mr Dallmann, thank you very much for talking to us today!

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optimys – good prospects after 5 years

A new publication of 5-year results shows that the Mathys short stem has successfully met the expectations of its developers, and that patients have also been very satisfied with it.

The optimys hip stem, a new-generation calcar-guided short stem, has been available on the market since 2010. It also forms part of the bone preservation system that Mathys offers together with the RM Pressfit vitamys cup and ceramic head. It meets all of the expectations of a modern implant. However, there are hardly any long-term or medium-term results to date for calcar-guided short stems.

In a recently published prospective study, the clinical and radiological results of the optimys short stem were evaluated in a 5-year follow-up. 216 total hip replacements were examined in 162 patients. The study participants were aged between 33 and 88 years at the time of surgery (mean patient age 63.5 years) and were observed over an average period of 61.7 months.

Survival rate 100 %, Harris Hip Score 97.8

The results of the study are impressive. The use of the optimys stem led to very good clinical results and high patient satisfaction after 5 years of follow-up: The survival rate for the short stems was 100 %; the Harris Hip Score 97.8 (out of 100) and satisfaction rating 9.7 (out of 10) on a Visual Analogue Scale (VAS).

Concerning migration behaviour, the study showed stem migration in the first six weeks in around 16 % of cases. Only approximately 1 % showed further progression within two years. No further axial migration was observed between two and five years, either in varus or valgus hips.

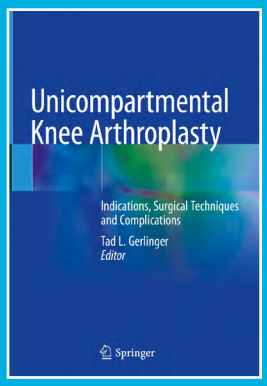
To conclude, this study found that even with the optimys stem, bone remodelling cannot be avoided completely. Some loss of proximal bone density was observed in around 42 % of cases. In contrast, very little bone remodelling occurred in the distal regions, which correlates well with the clinical absence of thigh pain and little evidence of cortical hypertrophy.

Source

Kutzner KP, Donner S, Loweg L, et al. Mid-term results of a new-generation calcar-guided short stem in THA: clinical and radiological 5-year follow-up of 216 cases. J Orthop Traumatol 2019;20(1):31-38.

Partial knee replacement – extensively illuminated

Unicondylar knee arthroplasty is on the rise. This book «Unicompartmental Knee Arthroplasty» contains everything you need to know about this treatment option.



Unicondylar knee arthroplasty, or UKA for short, is an established but highly technically demanding treatment option in advanced medial or lateral osteoarthritis. This book, published by Springer International, sheds light on the technique of partial knee replacement, which is becoming increasingly common. The text can be divided thematically into three sections: The first part covers indications, patient selection and choice of implants. The second part discusses surgical techniques for both the medial and lateral sides. The third part deals with management of surgical complications, including periprosthetic fractures and infections. Orthopaedic surgeons, sports medicine specialists and other interested physicians and nursing staff can find everything they need to know about unicondylar knee arthroplasty in 230 pages supported by 76 illustrations, 39 of which are in colour.

Gerlinger, Tad L. (Ed.). Unicompartmental Knee Arthroplasty. Indications, Surgical Techniques and Complications. Springer International Publishing. 1st Edition; 2020.

Social loafing: One «rotten apple» poisons the team

Teamwork is the key to corporate success in many clinics. Surgical teams can achieve optimal performance if all team members interact smoothly and work with optimism, motivation and commitment. But what happens when one group member constantly works less efficiently than the others?

Examples are the colleague who always has an excuse as to why they can't perform undesirable tasks or the team member who regularly arrives late and leaves early.

Can a team compensate for the underperformance of a «slacker»?

Researchers at the renowned UNSW Business School in Sydney, Australia, investigated the impact that so-called low performers or underperformers have on a team or on the efficiency of a team. [1, 2] The surprising result was that one «bad apple» in the team was sufficient to «infect» everyone else. Overall productivity declined by 30 to 40 percent. [1, 2] The ability to get along, share work and collaborate decreased significantly in teams with an underperformer. [1, 2] The atmosphere within the group also deteriorated significantly. The team was apparently unable to compensate for the underperformance.

The Ringelmann effect and the phenomenon of «social loafing»

The Australian studies confirm what agricultural engineer Maximilian Ringelmann discovered by accident in the late 19th century: He made students compete against each other in a tug of war and found that individual performance decreased with increasing group size. [3] American psychologists coined the term «social loafing» for the phenomenon known as the «Ringelmann effect» – lazing around at the expense of others. [4] People who are part of a team apparently reduce their performance if their individual performance is not visible enough. [5] This applies to both physical and mental tasks. [5] The researchers suspect that if the extent to which the individual contributes to the overall result is not clear, the willingness to perform decreases. [5]

What can be done about social loafing?

There are presumably tired and underperforming employees in every hospital. Overlooking this and ignoring «sleepyheads» shouldn't be an option. It's important to determine the underlying causes. Experienced HR consultants are certain that only around ten percent of tired employees are unwilling to perform. [6] The majority of them want to perform well, but are currently unable to. Supervisors should therefore avoid jumping to conclusions and labelling the employee a «slacker». [7] The employees may have stress in their private lives that is temporarily distracting them from their work. [7]

Or they don't know exactly what is expected of them and how they can best contribute to the team. [7] Maybe they feel demotivated because their performance has not yet been recognized. Psychologists and management experts have found approaches that can prevent social loafing: [6, 8–10]

1. Appreciating individual performance

Every team member should feel that he or she is making an important contribution, e. g. to the success of a patient activity or operation, and that this contribution is noticed and valued by the supervisor. When everyone knows his or her own significance and value, this increases motivation and a feeling of responsibility toward the group.

2. Define the roles in the team

All team members should know exactly what is expected of them. «*You are responsible for the surgery documentation, i. e. specifically…*». In addition to the individual tasks and goals, the team's shared goals should also be defined. It should be made clear to the idler what role and

responsibility he or she has within the team and the hospital.

3. Create new motivational spaces

«Social loafing» can occur when employees develop and want to take on new, demanding tasks, but are not allowed to. Give them the chance to grow! Offer training courses and further education. Perhaps the low performer can take on a new and important role in the team, e. g. responsibility for compliance with hygiene rules on the ward.

Experts are certain of one thing: «Social loafing» can be prevented – with trust, empathy and a caring team atmosphere that creates a strong sense of belonging.

You can get to the bottom of this idleness and find what distinguishes the different types in our checklist «Exposing loafers in the team».

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Download

You can download the checklist «Exposing loafers in the team» here.

Further reading

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Improving Healthcare Team Performance: The 7 Requirements for Excellence in Patient Care.
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Masthead

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