directLINK®

Magazine for Arthroplasty
Issue 01/2018

INTERVIEW

»THE IMPACTOR AND THE HIGH PRIMARY STABILITY MAKE ALL THE DIFFERENCE!«

Prof. Dr. med. Christoph Lohmann on the new LINK BiMobile® Dual Mobility System

LINK as a full service provider
AMEOS Head of Procurement Frank Schönrath on the reasons for the close cooperation of his company with LINK

Increasing efficiency with LINK
Dr. Gunter Trojandt on ways to increase efficiency in the digital operating theatre

LINK custom-made implants for obese patients How to protect morbidly obese patients from material breakage with a reinforced prosthesis

High primary stability

The roughened, open cell TiCaP® surface for high primary stability and a fixed implant-to-instrument connection for optimal positioning of the metal support are the outstanding advantages of the new anatomic BiMobile® Dual Mobility System from LINK. In addition, BiMobile® has a high range of motion (ROM), self-centring inlays, medio-ventral recess for the protection of tendons and nerves and many other interesting features. More information can be found on page 4 to 9.

Imprint

Publisher: Waldemar Link GmbH & Co. KG · Helmut D. Link · Barkhausenweg 10 · 22339 Hamburg, Germany · Phone: +49 40 53995-0 · Fax: +49 40 5386929 · E-Mail: redaktiondirectlink@linkhh.de · www.linkorthopaedics.com **Editor** (responsible): Heike Rasbach · E-Mail: redaktiondirectLINK@linkhh.de · Phone: +49 40 53995-0 **Editing/Design:** Dr. med. Michael Prang · www.michaelprang.de **Photography/Graphics:** Stefan Albrecht (Title, 3–6) · Prof. Dr. Dr. med. Wolf Robert Drescher, B.Sc. (20) · Dr. Brent Damer D.O. (20) · Dr. med. Erwin Lenz (25) · Prof. Dr. med. Christoph Lohmann (7) · Dr. med. Patrick Mouret (8–9) · LINK (10–13, 23, 25, 26, U4) · Dr. med. Michael Prang (15–16, 21–22) · Prof. Dr. Alberto Molino (21) Dr. Gunter Trojandt (18–19, 21)

Dear Readers,

The *America first!* sound bite from US President Donald J. Trump still echoes loudly. Not everyone agrees with this motto.

An appropriate, historically grown slogan is *Made in Germany*. Originally introduced in 1887 in Great Britain to protect against cheap imported goods, today, it is regarded by many consumers worldwide as a seal of quality.

At LINK, we develop and produce our implants under this premise. We have several good reasons for this. Our tradition as a family business with its roots in this country is one reason. The high level of training and comprehensive qualifications of our employees together with very close cooperation with doctors from German universities is also a reason for LINK to develop and produce our products in Germany. Without these doctors' surgical expertise, innovative implants such as our new BiMobile® Dual Mobility System would be more difficult to implement. You can read an interview about the advantages of the new BiMobile® with Prof. Dr. med. Christoph Lohmann, who carried out the initial implantation in a 93-year-old female, starting on page 4.

Our customers also find it extremely important that we develop and produce our implants in Germany under German quality conditions. You can read the interview with AMEOS Head of Procurement Frank Schönrath starting on page 16.

I hope you enjoy reading this issue of direct**LINK**

Regards,

Helmut D. Link

»The impactor and the high primary stability make all the difference!«

A conversation with Prof. Dr. med. Christoph Lohmann about the special features of the new BiMobile® Dual Mobility System from LINK.

INTERVIEW

Prof. Dr. med. Christoph Lohmann is Director of the Orthopaedic University Hospital Magdeburg and Chair of Orthopaedics at the Medical Faculty of Otto-von-Guericke University. In July 2017, he conducted the first implantation of LINK's BiMobile® Dual Mobility System.

Professor Lohmann, what is so special about the new BiMobile® Dual Mobility System from LINK?

This cup system is available cemented and cementless. The cementless option has a very good fit after implantation, and the instruments for reaming and acetabular preparation work well thought-out the procedure. The difference with this instrumentation is the impactor, which really does make a very special difference.

What is extraordinary about the impactor?

The instruments for this cup system have a fixed implant-to-instrument connection. This makes the coupling mechanism from implant to impactor very safe and secure. And there is no need for additional impactors to adjust the cup position, which is not the case with all systems. The unique design provides a recess between the connection from the impactor to the cup so that about a third of the rim of the cup can be seen when impacting. This helps considerably with precise positioning which is also not the case with other products.

How do you rate the primary stability of the BiMobile® Dual Mobility System?

I think the primary stability is very high. In the cementless implantations, which we have done so far, we have had an excellent impression of the seating and press-fit of the implant in the bone. The additional coating of the cup with titanium calcium phosphate is also helpful in cases with severe bone loss to ensure a quicker osseointegration.

What other advantages do you see with the BiMobile® Dual Mobility System compared with competitor products?

The range of motion (ROM) in the surgery was very good in my opinion. There was no malalignment and I think it's a very well-designed prosthesis to prevent luxations. A further advantage is the medio-ventral recess to protect the tendons and nerves during surgery. Not all systems have this, but I think it is an essential feature on these cups. The two trays which contain only a few instruments and are therefore not too complex for the instrumenting nurses, are also good.

Is using 28 mm heads in cup diameters as low as 48 mm an additional advantage?

Yes, because they reduce the risk of impaction between the stem and insert at an early stage resulting in an increased ROM.

What indications do you see for the BiMobile® Dual Mobility System?

Firstly the chronic instabilities of hip prostheses in revision surgery. I also see an application for tumour surgery, and in the next few years, I feel we will also be confronted with a large number of multiple hip arthroplasty revisions. I think there's a growing need for this. I can also imagine the implantation of this cup system in some selected primary cases.

What advice would you give your young colleagues and assistants for the implantation of the BiMobile® Dual Mobility System?

Like any surgery, this surgery must be very well planned. You also have to be prepared for the possibility of a Plan B, during a hip revision. If a cementless implantation is planned, it is also necessary to be prepared for a cemented version, possibly combined with a support ring, for example. It is also essential to use the trial heads and cups in order to restore the leg length. This has worked very well with the implantations that we have done so far.

You carried out the initial implantation of the BiMobile® Dual Mobility System on a 93-year-old female. Why?

We followed the indication. The patient was an otherwise very healthy and active lady who had suffered from chronic femoral head dislocation. Her wish was to have a stable cup. We discussed the cup

»I can also imagine the implantation of this cup system in some selected difficult primary cases.«

Prof. Dr. med. Christoph Lohmann

revision with her and decided to implant a cementless option because of the good bone quality available. That's why we chose the BiMobile® Dual Mobility System.

How's the patient doing today?

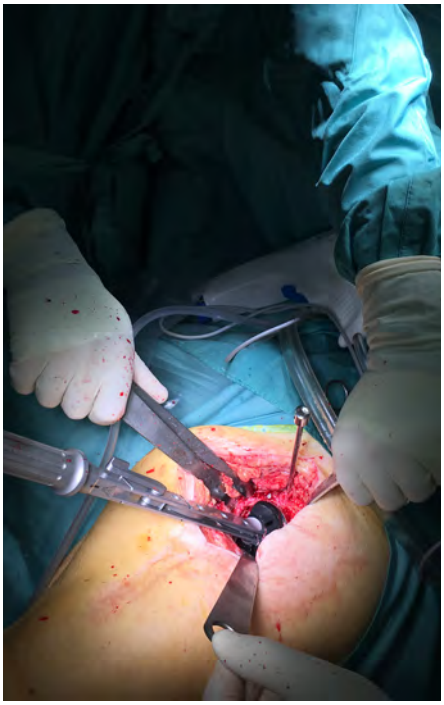
Very well indeed! The patient went home directly after being discharged from our clinic. She has returned for a check-up, and she is doing very well!

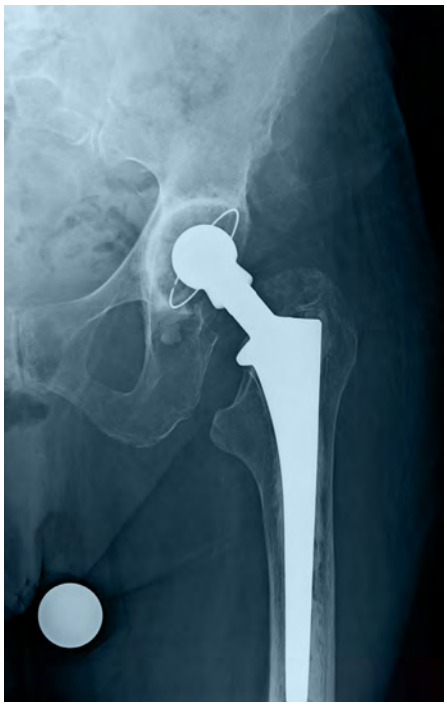
What is your conclusion regarding the new BiMobile® Dual Mobility System from LINK?

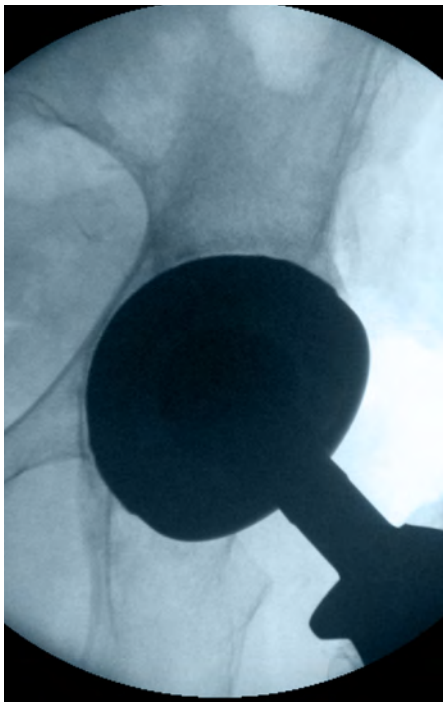
Implantation of this system is very easy and safe. What really needs to be emphasized is that based on what we have seen during the handling and surgical technique, this cup can actually be used like a conventional cup, because of the safe impression I got when positioning the shell. This makes the surgery much easier, especially in difficult cases. I believe this is a major step forward and a great help in terms of work-load. Many systems I have used previously have proven somewhat difficult to handle. The outstanding benefits for me are the great primary fixation and the stability provided through using the superbly designed impactor. Overall, the early impression of the BiMobile® Dual Mobility System is very promising.

Professor Lohmann, many thanks for this interview.

Cementless initial implantation of the BiMobile® Dual Mobility System in a 93-year-old female







CASE REPORT

The initial implantation of the BiMobile® Dual Mobility System was conducted by Prof. Dr. med. Christoph Lohmann in Magdeburg in July 2017.

The 93-year-old female patient suffered from chronic femoral head dislocation and had previously had several revision surgeries to try and remedy this situation. Otherwise, she was mobile and in good health; her wish was to have a stable cup situation. »We discussed the cup revision with the patient and decided to implant an uncemented cup because of the good bone quality available. We chose the BiMobile® Dual Mobility System for this purpose«, explains Prof. Lohmann. »There were no postoperative complications. She has already returned to our clinic for a check-up and she is doing very well!«

Top: Initial implantation of the BiMobile® Dual Mobility System in July 2017. Left: the middle instrument is the impactor; right: Prof. Lohmann prepares the inlay.

Below: Pre- and postoperative x-rays; »Overall, the first impression of the BiMobile® Dual Mobility System is convincing«, says Prof. Dr. med. Christoph Lohmann.

»The new MobileLink® is much easier to implant!«

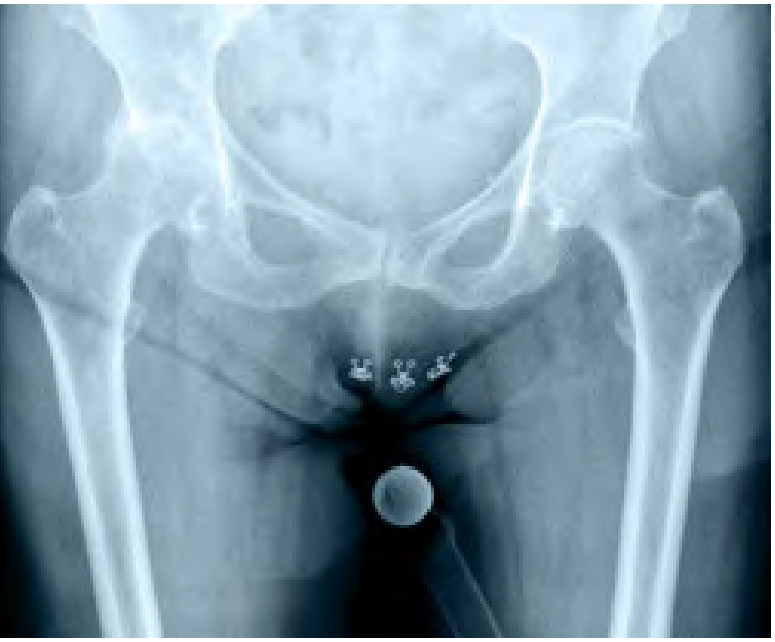
How is the integrity of the press-fit? How valuable is the new colour coding in OR practice? A conversation with Dr. med. Patrick Mouret about the new MobileLink® Acetabular Cup System from LINK.

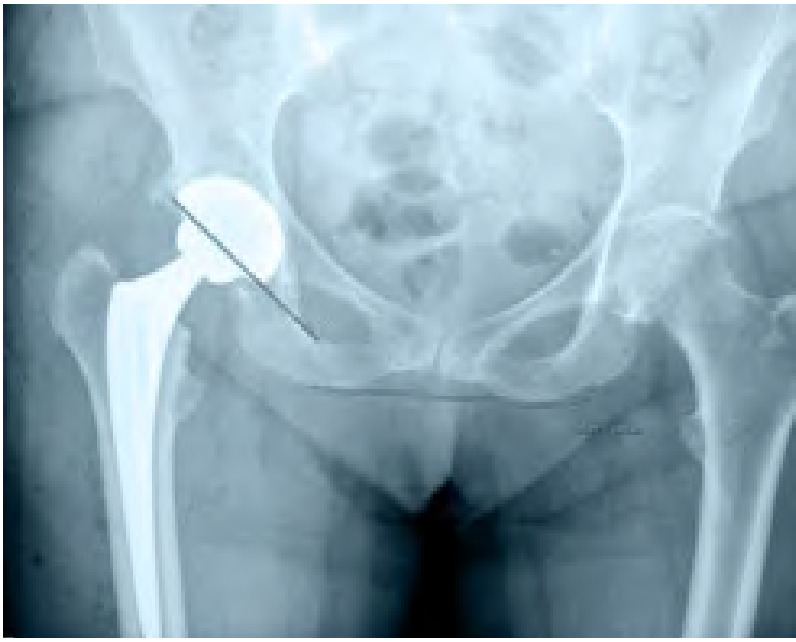
Dr. Mouret, in August 2017, you conducted the first implantation of LINK's new MobileLink® Acetabular Cup System. What is your impression?
The first implantation, and others which I have carried out since then, have all gone very well. The new feature of the MobileLink® Acetabular Cup System is the significantly simpler implantation technique. Central impaction at the pole of the cup provides a much better press-fit feeling. I can impact the cup fully into the bottom of the acetabulum easily with a standard hammer. The fact that I can choose between ceramic and polyethylene inlays is also a great advantage.

How does the MobileLink® perform in comparison with its competitors?
There are press-fit cup systems on the market which are easy to impact but too thin, so they can deform easily. This is not suitable for the BIOLOX®delta inlay, which I prefer, because it would then tip over in the cup. The MobileLink® achieves the golden mean for wall thickness. This allows me to place the BIOLOX®delta inlay safely, even though the wall is not as rigid as it is with other cups.

How do you evaluate the primary stability of the rough TiCaP® surface?
I think the roughened TiCaP® surface is the major reason for the high primary stability of the cup.

What significance does the possibility of additional fixing of the cup with screws have for you?
That's good, of course. The variable screws and angles are also good, because if you are forced to use a screw at a certain angle, you might end up where you did not want to go. Personally, however, I trust in the press-fit stability and do not use any additional screws. A spherical socket in a primary implantation that is not firmly seated does not become firmer with an additional screw





Initial implantation of the MobileLink® Acetabular Cup System in August 2017; X-ray: left preoperative, right postoperative; MobileLink® Acetabular Cup System with SP-CL® hip stem in situ

connection.This has been my philosophy for decades. I have implanted many different cup concepts. A cup only has primary stability if it fits well without screws.

What do you think of the different inlay materials?

It is an advanatage to have all three options with one cup. There are cups in a reinforced version for ceramics and a thinner one for polyethylene - but you have two different cups. If you want to use polyethylene or ceramic, you would need twice as many implants. This would increase storage costs and confusion for all involved.

Concerning the risk of confusion: What is the benefit of the colour coding system in OR practice?

The colour coding is new and extremely helpful. The corresponding colours yellow for yellow and blue for blue, for example, make implant selection easier, safer, and more relaxed.

What are the indications for the MobileLink® Acetabular Cup System?

First of all, primary implantations, but I also see the MobileLink® working well in cases of hip dysplasia. Face changing adaptors are then combined with the inserts. If you implant the cup at an angle of 60 degrees, the adapters offer 10 to 20 degrees of further inclination, so you can still use a ceramic inlay. This was not available previously.

What advice would you give to younger assistants, who want to implant the MobileLink®?

It's too early to confront inexperienced colleagues with this system. The learning curve with the MobileLink® will surely be steeper than with other systems. Implanting this cup is not difficult, so younger colleagues will have it easier than I had in the past.

Dr. Mouret, many thanks for this interview.

»The corresponding colours yellow for yellow and blue for blue, for example, make implant selection easier, safer, and more relaxed.«

Dr. med. Patrick Mouret

INTERVIEW

Dr. med. Patrick Mouret
is Head of the Prosthetics Division at the Sana Klinikum Offenbach. In August 2017, he conducted the first implantation of LINK's new MobileLink® Acetabular Cup System.

MobileLink®

Acetabular Cup System

- Wide range of sizes (ø 42–80 mm)
- Great versatility, small stock
- Increased efficiency with an extremely well designed implant portfolio, state-of-the-art instruments and colour coding

MobileLink®
Acetabular Cup System

TiCap® Cluster Hole

TiCap® Multi Hole

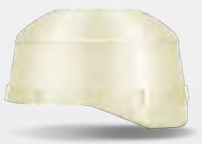
Inserts

X-LINKed®

Ceramic

E-DUR®

X-LINKed® (Anti-luxation)



E-DUR® (Anti-luxation)

Shell/Insert Adapters (Face Changers)

Neutral

+4 mm Offset

10° Inclination

20° Inclination

System Description

The MobileLink® Acetabular Cup System exists in two versions: A Cluster hole Shell and a Multi hole Shell.

The MobileLink® Acetabular Cup System offers the choice of using either ceramic or UHMWPE Inserts. The ceramic components are made using the latest offering in orthopaedic ceramic technology – BIOLOX®delta Inserts*. UHMWPE Inserts are offered as X-LINKed® and E-Dur® (X-LINKed® Vit-E PE). All UHMWPE Inserts are available in standard and anti-luxation designs.

The MobileLink® Acetabular Cup System can be combined with modular offset and/or inclining Shell/Insert Adapters (Face Changers) to help restore the anatomy in revision treatments. Additionally, the Shell/Insert Adapters allow the use of ceramic inserts in revision surgeries.

The MobileLink® Acetabular Cup System is available with a TiCaP® double coating. The TiCaP® double coating combines a highly porous surface to achieve primary fixation and an osteo-conductive** calcium phosphate coating, which together are intended to ensure optimal primary and secondary implant stability.

*BIOLOX®delta are products made by CeramTec GmbH, Plochingen, Germany.

**Literature via redaktiondirectLINK@linkhh.de.

BiMobile®

Dual Mobility System

- 28 mm prosthesis heads with a cup diameter from 48 mm
- Identical instruments for cemented and cementless surgeries offer intraoperative flexibility
- Safe implantation through optimized instrument design
- Proven EndoDur® cobalt-chrome alloy

BiMobile®
Dual Mobility System

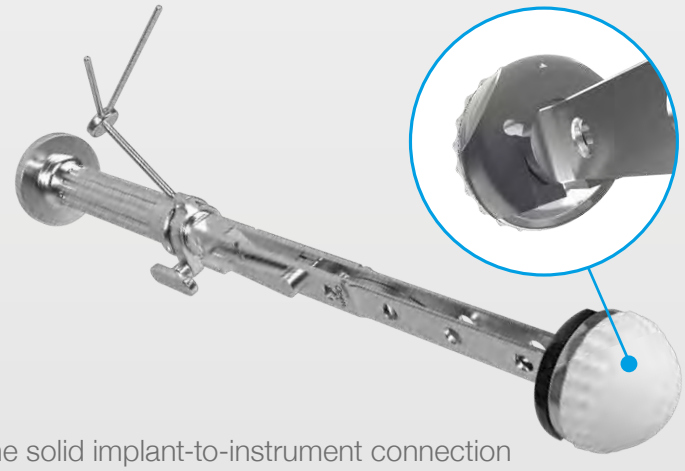
Cementless

Cemented

Liner

UHMWPE

Optimized instrument design



The solid implant-to-instrument connection and a good view of the cup margin enable safe implant placement.*

The Dual Mobility Concept

The Dual Mobility concept was developed by Professor Gilles Bousquet in 1975. The system is composed of a Shell with a highly polished inner surface and a mobile polyethylene liner.

The concept is based on two articulating surfaces where the prosthesis head articulates with the Liner and, simultaneously the Liner articulates with the Shell. Because of the small prosthesis head size, wear is minimized.*

The small 22 mm or 28 mm heads are assembled with the help of a press. The large articulating liner incorporates a high »jump« distance to reduce the possibilities of sub-Luxation. This concept further leads to reduced risk of dislocation and an increased range of motion.*

*Literature via redaktiondirectLINK@linkhh.de.

»The more elective a medical service is, the more patients choose their own doctor.«

Prof. Dr. med. Matthias Gebauer

»All our patients benefit from our joint experience!«

A conversation with Prof. Dr. med. Matthias Gebauer about the reasons for his decision to move from a large hospital to a medical practice.

Professor Gebauer, why did you change your career from working at one of the world's most renowned hospitals for a medical practice in Bremen?

I find it extremely interesting to supervise the treatment pathway from start to finish. Not only the actual surgery but also what happens to the patients weeks and months later. In the clinic, the line between in-patient and out-patient treatment simply does not allow this.

Did the relatively high workload also play a role?

No, but making my work more self-determined surely played a role. For example, I want to accumulate the hours in the clinic with high workloads and thus be able to work more effectively and that works out very well now. In a large clinic, working time and workload are less calculable, even if the core process in the OR is very well structured.

Doesn't the self-determined controllability of the working day also involve new tasks?

Yes, I have entrepreneurial tasks such as personnel management and process management. The opportunity to be a player in the planning process and to decide when and how to do something was also a strong motivator for my decision.

How long did your idea of getting out of the clinic take to mature?

There were several offers to take on an executive position, from smaller hospitals/centres that want to specialize, to bigger units that were looking for a successor. Large university hospitals were also present. I took time to explore the offers and visited many clinics and practices. Three years have passed from the initial contact to the decision, but that's the time it takes.

Where do your patients come from today?

There are patients who have been coming to our clinic for a long time. Some patients are looking for a suitable surgeon and many of these patients come from more distant regions.

What does your practice clinic offer patients?

Previously, reconstructive joint surgery and arthroplasty had not yet been performed in our clinic – only pre and post-operative care and other operative services were offered. We now offer a complete range of services from sports medicine, orthopaedics, and trauma surgery to the prosthetic completion of rehabilitation. We're six doctors who see each other every day and do case reviews. All colleagues have been senior physicians in large orthopaedic clinics and have extensive surgical

INTERVIEW

Prof. Dr. med. Matthias Gebauer was Senior Physician in the Department of Joint Surgery at the ENDO-Klinik Hamburg. In 2016, he moved to a clinic constellation in Bremen, Germany. As one of six orthopaedic specialists and trauma surgeons, he covers the treatment pathway of degenerative joint diseases of the hip and knee.

experience in various areas. All our patients benefit from our combined experience.

Isn't that what the large clinics offer?

Of course, but as a smaller unit, we have more efficient and effective information management. There is a well-documented file for each patient, with all secondary illnesses, allergies, and consultation reports from other areas. The patient who is to be operated on will then already know the doctor who is going to operate on him. This gives the patient a better idea of how his or her in-patient treatment will be performed later on.

How did the implant manufacturers react to your job change?

The implant manufacturers were very positive and supportive! That took away some of my worries, too. Especially if you want to reproduce high quality arthroplasty, a surgeon needs a good partner in the industry who will continue to stand behind you. There has been and still is a really good support in this respect.

Does your cooperation with LINK continue now as it did at the ENDO-Klinik?

The centre where I am performing my surgeries today has been in contact with LINK before. We have adapted some of the portfolio of implants and I am still discussing special requirements four weeks before the procedure with LINK. Everything is the same as before.

LINK develops and manufactures its implants in Germany. Does the production location of Germany play a role for you as a surgeon?

A very big role indeed. More patients intensively involve themselves with their joint replacement. The more patients deal intensively with and read about their joint replacement, the more frequently they ask questions about implants, implant quality and even National registry data. I am happy to explain all of this, and I also tell them which qualitative aspects motivate me to choose a certain implant. I also believe that it is important to the patients to know who operates on them. These questions are definitely increasing. The more elective a medical service is, the more patients choose their own doctor.

What advice do you give colleagues who are in a similar situation?

Before making a decision, you should look at all possibilities, including the outpatient sector. In arthroplasty, medical services do not necessarily have to be linked to a large clinic. This is common practice in other health care systems and I believe that it will also become a focus of attention in Germany in the coming years.

Professor Gebauer, many thanks for this interview.

»Procurement in the health care sector must be massively upgraded!«

What are the advantages of working with a full-service provider in arthroplasty? A conversation with Frank Schönrath, Head of Procurement and Logistics of the AMEOS Group, about decision-making processes, communication, and transparency.

Mr Schönrath, the AMEOS Group has reduced the number of their suppliers from 13 to two, and LINK is one of the partners. What led to this decision?

With the streamlining, we wanted to achieve a positive economic effect, which then came about in this way. LINK has high quality products with very good registry results, including a proven revision portfolio. The service and support are the same as we would like to see at AMEOS.

What else does a full-service provider have to offer besides quality and economical prices?

Good communication skills, reliable logistics, simple ordering processes and invoicing, low administrative effort, and fast delivery are very important for the AMEOS Group. However, simple and smooth bilateral communication is crucial. With LINK, this works out very well, especially in the operative business.

How did you come to the decision to contract LINK as a full-service provider?

We took a close look at the portfolios of all market players and clustered them according to criteria that are essential for us: quality, service, technology, and price. LINK and another provider were left over. We then had intensive discussions. In the end, a specialist group consisting of members of the Executive Board, regional managing directors, chief physicians, and purchasing department decided in favour of LINK.

»We took a close look at the portfolios of all market players and clustered them according to criteria that were essential for us.«

Frank Schönrath

INTERVIEW

Frank Schönrath is Head of Procuremenet and Logistics of the AMEOS Group, one of the largest health care providers in the German-speaking countries which is headquartered in Zurich, Switzerland. The Group com-prises 76 facilities at 40 locations and 12,700 employees in hospitals, polyclinics, nursing, and integration facilities.

Did only economic efficiency play a role in this decision?

No, we have also dealt extensively with materials used in arthroplasty and compared the products at this level. We were also interested in the production processes: what are the risks for a supplier, how modern is the product technology and how do they differentiate themselves from other suppliers? As a characteristic of innovation capability, the proportion of sales revenue that flows into the development of new products is also interesting, and of course, the price plays a role. In our research, we found that some providers with the interesting key figures are more open at that point than others. LINK provided us with the data we needed. Some companies in this respect, are not favoured by us because we expect absolute transparency in a partnership.

How much do the chief physicians participate in decisions regarding suppliers and implants?

Every company needs to know how profitable a product is. We do not decide only according to medical indications, but also according to the quality of a product, service quality, technology, and price. The chief physicians are at the forefront of medicine, but it is not only them at the forefront of such decisions.

Is that a deliberately chosen process of professionalization?

Yes! A chief physician is an absolute professional in medicine, as are the people working in medical controlling and procurement. These are completely different roles which ideally rely on each other and work very closely together. We therefore deliberately involve our senior physicians in the decision-making process to help determine who becomes a supplier and which implants are purchased. The idea that it is only a chief physician who determines what is delivered is generally incorrect.

Why should the procurement and purchasing departments have more influence in medical decisions?

The German healthcare system incurs a total of around 60 billion euros in material costs per year. The 40,000 employees in the sales departments of the suppliers are faced with just 600 professional purchasers – that makes it difficult to establish an effective partnership-based cooperation. Procurement and purchasing in the health care sector must therefore be massively upgraded. If we can also create an understanding in the industry that in a hospital group, the purchasers are the most important contact people, then there is a win-win situation for everyone.

How much is it of interest to AMEOS that implants are developed and produced in Germany?

This aspect is very important! It is crucial that development and production is carried out under German quality conditions. Through our close cooperation with LINK, we are consciously expressing the fact that efficient and affordable German innovations are important to us. On the other hand, I see problems for some products who do not have any significant reputation, for example some companies from Asia, because the German market does not accept this.

Mr Schönrath, thank you very much for this interview.

The surgeon works with the electronic operating instructions as a checklist that is displayed on monitors (example photo of an ENT surgery)

»This is how to increase efficiency in the OR!«

Better results, faster operations, lower costs – efficiency in the OR can be increased even more. A conversation with Dr. Gunter Trojandt, Managing Director of the Surgical Process Institute SPI in Leipzig, Germany, about the possibilities of digital standardization in the OR, and how LINK implants can be integrated into it.

Dr. Trojandt, a surgeon makes a CT of his patient's knee, plans the implantation of the prosthesis based on the scans and orders it directly from the manufacturer including all individual specifications with just a mouse click. Is this vision already a reality?

Provided that the 3D planning is very accurate, this is realistic. A manufacturer like LINK can provide the surgeon with exactly the custom built implant he needs for his individual patient. The clinic would save storage capacity because it does not need to have several sizes of an implant at its disposal. This is how to increase efficiency in the OR! However, it is only a part of what is possible in this area.

What else is possible to increase efficiency in the OR?

In surgery, individual work is done from the first cut to the suture. Every surgeon goes about surgery the way he has learned it from his master. This means that there are many different approaches to surgical procedures and often different results. The solution to this dilemma is a fully standardized clinic in which doctors work according to processes that have been precisely defined in advance.

Who defines these processes?

The suggestion for a process can come from an implant manufacturer, from the clinic, or from a surgeon. However, it is usually the chief physician who determines the process in detail at the end. Our role as SPI is to provide the surgical team with the agreed process during surgery.

How does that work, for example, with a knee TEP?

First, the complete surgical procedure is broken down into about 60 steps from the first incision, positioning of the tibial cutting block and the prepa-

INTERVIEW

Dr. Gunter Trojandt is Managing Director of the Surgical Process Institute Deutschland GmbH (SPI) in Leipzig, Germany. His company develops concepts for a structured, digital medicine for various areas, including arthroplasty.

Dr. Gunter Trojandt is Managing Director of the Surgical Process Institutes GmbH (SPI)

ration of a control X-ray image all the way to the last suture. A surgeon in training or someone who has not used the implant very often can use the result as an electronic surgical guide and learn how to perform the procedure optimally. It is important to note that no matter who does the surgery, it is always performed according to the same agreed process. Therefore the instrumentation nurse can always be ready and prepared for the next step.

How does working according to predefined processes in the OR work practically?

The surgeon is shown the instructions on monitors and works with it as a checklist. Each completed step is marked with a time stamp and must be confirmed immediately after the step has been completed. If a complication occurs, the surgeon proceeds with the appropriate sub-process. At the end of the procedure all processes become clear. What might sound banal at first glance opens up an almost infinite array of possibilities to improve the results and efficiency of the surgery. These observations can be used to determine where further training needs to be carried out in order to improve cutting-to-suture times, for example, or to optimize trays and surgical consumables. However, you can also see when surgery times improve and the error rate decreases.

Can the processes be continuously optimized?

Of course, the continuous optimization is an adaptive learning process. When many surgeons or even the entire clinic work according to the process, you see very quickly what works well, what does not work, and what is mediocre. You see, for example, that step 18 takes a lot of time in a surgery and that a different instrument may be necessary. Surgeons can optimize the process themselves by modifying or extending data, measurements, intermediate or final surgical steps. This process gradually reduces the error rate and, reduces time and costs. For example, the creation of a CT and the direct 3D planning and ordering of the individual implant from LINK can be set up as a preoperative process.

Who is the system suitable for?

The system is very well suited if, for example, a lot of young surgeons need to be introduced to a surgical procedure in order to achieve the same quality of results at all locations of a hospital group. Standardization and process catalogues could also be used as a starting point for further training in workshops in which surgeons are trained in the use of specific implants.

Dr. Trojandt, thank you very much for this interview.

»The SP-CL® and the DAA are a very convincing combination!«

SP-CL® – anatomically adapted hip system, cementless with HX®

INTERVIEW

What are the advantages of the Direct Anterior Approach (DAA) in implanting a hip prosthesis? How can young surgeons best approach the DAA? A conversation with four experienced users.

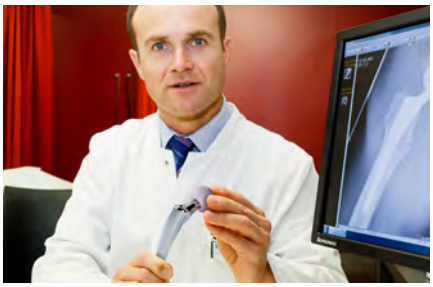
Professor Drescher, Dr. Damer, Professor Momoli, Dr. Skowronek, together you have performed many hip replacements using the 'Direct Anterior Approach'. What are the advantages of the DAA?

Prof. Drescher: In my department, the DAA is the standard approach because I am convinced of its benefits. All muscles are preserved and only one capsule window is required for implantation. I've been using the DAA for five years and have performed over 1,000 hip surgeries with it.

Dr. Skowronek: The DAA is an inter muscular approach, so the natural muscle tension is retained postoperatively. The advantages for the patient are outstanding, especially in the first three months after the surgery. I believe the DAA is the future of hip replacement.

Dr. Damer: I like the fact that it is a muscle sparing approach which then can allow for a quicker immediate recovery in the first six weeks to three months. It also allows more confidence in not having to restrict range of motion postoperatively. Intraoperatively it also allows for x-ray to easily be brought in to check component position and leg lengths more reliably.

Dr. Brent Damer, D.O., is a hip, knee, and joint replacement and revision Orthopaedic Surgeon in Muncie, Indiana, USA



Prof. Dr. Dr. med. Wolf Robert Drescher, B.Sc., is Head Physician at the Clinic for Orthopaedic Surgery of the Lower Extremities and Arthroplasty of the Hospital Rummelsberg in Schwarzenbruck, Germany

How does the LINK® SP-CL® perform when implanted via the DAA?

Dr. Damer: Really well, due to the anatomical fit and fill design of the stem. I feel that the geometry will go nicely with the DAA.

Prof. Momoli: I have long believed that it is not easy to implant a standard stem using the DAA. With the SP-CL® I have changed my mind. In this context, there are no differences between a short stem and a standard stem. The SP-CL® is an anatomical stem that is easy to insert into the femur. You just have to respect the anatomy of the femur without changing the anteversion or retroversion.

Prof. Drescher: The SP-CL® is part of my overall concept. I have many young patients with femoral head necrosis. For this purpose, I need sustainable bone saving and tissue preserving care concepts. I therefore use femoral neck preserving short stems and the overall bone

preserving SP-CL®. The SP-CL® and the DAA are a very convincing combination for me. The anatomical design is very much in keeping with the minimally invasive DAA.

Does the SP-CL® together with the DAA also lead to cost advantages?

Dr. Skowronek: Definitely! With the DAA, our patients stay an average of 2.6 instead of 5.5 days in the clinic. We estimate from around 600 implantations that the DAA takes 36 percent less time than the posterior approach. This clearly leads to cost advantages.

Is it also a cost advantage that DAA implantation of the SP-CL® requires only a few simple instruments?

Dr. Skowronek: The simple, user-friendly instrumentation of the SP-CL® allows most surgeons to use their preferred standard instrumentation so the expensive sets and extension tables do not have to be purchased for the DAA. In addition, less space is required for the instruments at the operating table. An inexperienced team of doctors and nursing staff can also learn the procedure very quickly.

What is the best way for young surgeons to learn and optimize the SP-CL® implantation and DAA techniques?

Prof. Drescher: The DAA demands a high level of anatomic knowledge and

Prof. Dr. Alberto Momoli is Director of the Orthopedics Department of the San Bortolo Hospital in Vicenza, Italy

Dr. n. med. Paweł Skowronek is Chief Surgeon of the Regional Hospital Kielce, Poland

excellent surgical expertise. The skin incision must be in the right place, as well as the deep preparation, in order to create as little damage as possible to the tissue. It might make sense to start with a short stem prosthesis that preserves the femoral neck of the femur, because here, the special capsule preparation is not absolutely necessary. In addition to the SP-CL®, LINK also offers the C.F.P.® hip prosthesis with the curved short stem and the LCU® straight stem, for example.

Prof. Momoli: I do not think the DAA is a difficult approach. No problems arise if the anatomical landmarks are respected and taken into account. When implanted correctly the SP-CL® does not over-stress the bone and does not alter the anteversion or rotation of the stem. However, I recommend beginners to start with a short/er stem and then switch to the SP-CL® after gaining some surgical experience.

Dr. Skowronek: It is certainly possible to start with the SP-CL® right away. It is a very simple stem to implant, so you can concentrate on the DAA and don't have to focus too much on the stem. My advice is to start with the LCU® straight stem, and then switch to the SP-CL®. However, first you need a lot of theoretical knowledge. You should study relative videos and books and watch live surgeries. After that, you should attend a cadaveric workshop at the LINKademy® and do your first implantation there. After a few of your own implantations, you will be ready for some live surgery sessions with experienced surgeons to learn tips and tricks.

Do you expect a short or long learning curve?

Dr. Damer: The SP-CL® stem is a bit longer, so this may take some time getting used to with the DAA. The built in anatomic anteversion of the SP-CL® stem allows the surgeon to follow the anatomy of the femoral canal during implantation. I think it's going to be one of those where the surgeons should keep in mind that you don't have to work in any anteversion. With the thinner implants, you can gain a bit of extra anteversion in the canal but the SP-CL® follows the anatomy; you're just preparing straight down with the anatomy. To me, there's a bit of a freedom in being able to do that and knowing that when I put in the stem, I'm automatically going to have anteversion built into it.

Prof. Momoli I agree with that. After completion of the learning curve, however, the implantation of the SP-CL® via the DAA is a very fast, very safe, reproducible and a particularly successful treatment for the patient.

Prof. Drescher, Dr. Damer, Prof. Momoli, Dr. Skowronek, many thanks for the interview.

LINKADEMY

As a guest at the Charité: Knee Surgery Level 2 Course

The LINKademy® Knee Surgery Level 2 Course took place at the end of August 2017 in the world-famous Charité Institute of Pathology. For two days, the 16 international participants broadened their knowledge of the implantation technique of the LINK® Endo-Model® Rotational Hinge Knee System and the LINK® GEMINI® SL® Total Knee Replacement and exchanged their experiences, ideas, and case studies.

After an introduction to the theory, a cadaveric surgery hands-on workshop formed the practical part of the course.

Dr. Philipp von Roth (Head of Knee Arthroplasty at the Center for Musculoskeletal Surgery of the Charité) and Dr. Dragos Popescu (Hospital Universitari Clínic de Barcelona) provided insights into the prosthesis systems as well as sharing personal tips and tricks. Before the start of the course participants visited the LINK casting factory VACUCAST®.

All graduates of the LINKademy® Knee Surgery Level 2 Course automatically qualify for the LINKademy® Knee Surgery Level 3 Course.

ASEAN Knee Symposium: 25 Years LINK® GEMINI® SL®

At the LINKademy® ASEAN Knee Symposium, more than 30 participants celebrated the 25th anniversary of the LINK® GEMINI® SL® Total Knee Replacement. The primary knee system continues to offer one of the highest standards in knee arthroplasty and impresses surgeons worldwide with excellent evidence-based results. The interactive symposium under the direction of Dr. med. Lutz Eckart (AMEOS Klinikum Halberstadt) and Prof. Dr. Qu Tiebing (Pok Oi Hospital Beijing, China) offered the participants numerous talks by experienced international speakers on current strategies and designs as well as therapeutic solutions in modern knee arthroplasty.The topics ranged from unicondylar and total knee arthroplasty to revisions and case studies.

Level-3-Training at the Helios ENDO-Klinik Hamburg: Periprosthetic Joint Infection (PJI) Master Course

When do I perform a one-stage or a two-stage revision? What is the best protocol? These and other challenging questions were discussed during the first LINKademy® Periprosthetic Joint Infections Master Course organized with the reference centre for PJI, the Helios ENDO-Klinik Hamburg, Germany. The Level 3 course, which is designed for orthopaedic surgeons, infection control specialists, and microbiologists, focused on pre-, intra- and post OP protocols for the one-stage exchange procedure for PJI successfully practiced at the ENDO-Klinik.

Under the chairmanship of Medical Director Prof. Dr. med. Thorsten Gehrke, the six participants spent two days exchanging views on the diagnosis, therapy, and prevention of PJI and discussing their own cases with the senior physicians of the ENDO-Klinik, Dr. Akos Zahar and Dr. Peter Stangenberg. In the practical sessions, the participants attended a one-stage revision surgery and subsequently broadened their skills with the implantation technique of LINK implants used in the ENDO-Klinik for revisions. These include the MP® Reconstruction Prosthesis, the SP II® Revision Stem, the Pelvis Support Revision Cup, the Endo-Model® Rotational Hinge Knee System, and the Endo-Model® Arthrodesis Nail.

The event was rounded off with a visit to the LINK factory.

Materially and constructionally reinforced knee replacement from LINK in case of imminent material breakage due to extreme obesity

CASE REPORT

The worldwide rise in the number of patients with morbid obesity requiring prosthetic treatment increases the incidence of material breakages due to overload. This is especially true if these patients have a higher level of activity. The solution to this problem can be found in extra-large, reinforced implants, which LINK develops and manufactures according to individual patient specifications.

Correspondence address:
Dr. med. Erwin Lenz
Chief Physician at the Clinic for Joint Revisions and Infections at the Rummelsberg Hospital in Schwarzenbruck, Germany
erwin.lenz@sana.de

In May 2015, a 53-year-old farmer of 130 kg and 175 cm with an infected knee prosthesis was referred to the Clinic for Joint Revisions and Infections at the Rummelsberg Hospital in Schwarzenbruck. After explantation of the infected prosthesis, a LINK® Endo-Model® SL® Hinge Knee Prosthesis was implanted.

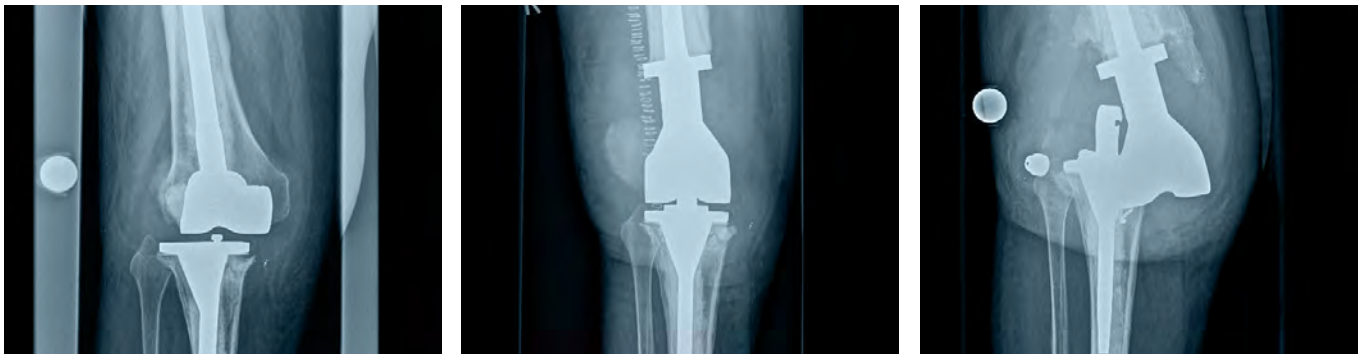
In June 2016, the patient returned to the clinic with a broken bushing. The bushing and distal femoral replacement were revised. »We informed the patient that the high physical strain from farming and his obesity likely played a significant role in the material breakage«, says Dr. Erwin Lenz, Chief Physician at the Rummelsberg Hospital in Schwarzenbruck, Germany.

Seven months after the first revision however, a further material breakage occurred in February 2017. The patient was therefore fitted with a new hinge axle. Only one month later, the patient came to the clinic for the third time with a conical breakage of the partial replacement module.

»After the third material breakage, we implanted a new hinge axis and asked the patient again to reduce his physical strain, because this, together with his obesity, could otherwise cause further breakages«, says Dr. Lenz. »The patient seems to be following these requirements, because so far, no further problems have occurred. However, we have made provisions for the event of a fourth material breakage and contacted LINK. Together, we've worked out a potential solution for this patient«.

This solution could be a reinforced distal partial replacement, which LINK develops and manufactures according to the patient's specifications as a custom-made implant.

The fact that such a reinforced custom made implant can be justified is shown by the example of a 200kg heavy and 200cm tall 52-year-old patient with gonarthrosis and condition after several anterior cruciate ligament plastic surgeries on the right. In order to avoid a material breakage due to the extreme obesity in connection with a high level of activity, the patient was indicated for implantation of a cemented hinge prosthesis (monoblock) with extra-large joint components and enlarged axle bearing, made of the approximately 30 percent stronger EndoDur™-S.



Axle pin breakage in June 2016 (left); condition after revision surgery: axle replacement with implantation of a distal femoral replacement (centre); new axle breakage at the beginning of February 2017 (right)

Condition after revision surgery with implantation of a new axis (left); conical breakage of a partial replacement module; axle breakage at the end of February 2017 (right)

Custom-made, extra-large hinge prosthesis due to gonarthrosis and condition after several anterior cruciate ligament plastics in a 52-year-old patient weighing 200kg and measuring 200cm (above the extra-large hinge prosthesis compared to a standard-size prosthesis, bottom right in situ)

Honorary doctorate for Helmut D. Link

After a surprising announcement by the head of the orthopaedic department, Prof. Univ. Dr. Florin Cătălin Cîrstoiu, Helmut D. Link was awarded the title of »Doctor honoris causa« by the Carol Davila University of Medicine and Pharmacy in Bucharest, Romania.

The award certificate was handed over on 2 July 2017 by the President of the University, Prof. Dr. Mircea Beuran. In his laudatory speech, the dean stressed the special commitment of the owner of Waldemar Link GmbH & Co KG to arthroplasty: »This gentleman deserves the title more than anyone else. 500 patents applied for. Who else can say that here?«

Under the leadership of Helmut D. Link, the LINK Group, which also owns the casting factory VACUCAST® in Berlin and the development company DERU in Norderstedt near Hamburg, has filed more than 1,500 patents, of which Helmut D. Link is the sole or co-inventor of some 500 patents.

mint:pink: seven technically enthusiastic girls on a tour of discovery at LINK

Seven schoolgirls from the Hamburg area visited LINK recently to find out more about medical technology. They took part in mint:pink, a program for girls who are interested in mathematics, physics, chemistry, or IT.

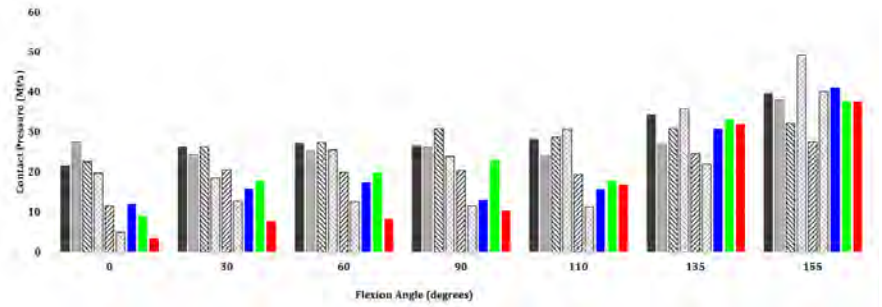
Since 2014, LINK has been continuously involved in the mint:pink initiative and organizes two such events a year. The aim is to demonstrate to the participants the exciting fields of work that can arise when choosing a scientific pathway in the upper secondary school.

A team of personnel, marketing, and development staff from LINK spent several hours with the girls. They learned how LINK produces the products and how development engineers are involved. The girls assembled instruments and saw an animation about how they are used. »The events are very lively and the feedback from the participants is excellent«, says Susanne Küchen, Head of Human Resources at LINK.

Deutsche Shell Holding GmbH, Hamburger Hochbahn AG and Lufthansa Technik AG are also involved in mint:pink.

Study[1]: The LINK® GEMINI® SL® design behaves similarly to the Hi-Flex design of competitors

The LINK® GEMINI® SL® total knee replacement behaves similarly to the Hi-Flex design of competitors. This is shown by a study that used validated finite element modelling (FEM) under the same conditions as a previous experimental study with various Hi-Flex competitor designs.



Tibio-femoral surface contact pressure (MPa) versus flexion angle. The diagram shows a summary of the data for the studied LINK® GEMINI® SL® designs with 3,600 N and the results of six competitor High-Flex designs. In general, the contact pressure increased with rising bending angle, especially with low flexion. Blue bars: LINK® GEMINI® SL® Fixed Bearing PS, green bars: LINK® GEMINI® SL® Fixed Bearing CR, red bars: LINK® GEMINI® SL® Mobile.

The LINK® GEMINI® SL® PS, CR Fixed Bearing, and the LINK® GEMINI® SL® Mobile Bearing were selected for the analysis.

The study examined the proximal interface on the contact surfaces and the pressure of the GEMINI® SL® total knee joint prostheses with UHMWPE application using FEM analysis over the entire range of motion from 0 to 155° flexion with a standardized test protocol, and compared it with the contact pressure and interface of the High-Flex designs of the participating competitors under the same conditions. The study shows that the LINK® GEMINI® SL® design is superior to competitive products in terms of contact area (higher) and contact pressure (smaller) between 0° and 110°. At 135° and 155° flexion, the behaviour with regard to contact surface and contact pressure is comparable with that of competitors.

*Literature via redaktiondirectLINK@linkhh.de

[1] Innocenti B.: Biomechanical analysis of GEMINI® SL® total knee replacement implant designs up to 155° of flexion; Université Libre de Bruxelles, École polytechnique de Bruxelles, BEAMS Department (Bio Electro and Mechanical Systems), 2017

Study[2]: The LINK® SP II® Lubinus® Hip Stem is stable without migration ten years after implantation.

The LINK® SP II® Lubinus® Hip Stem is stable even ten years after surgery. This is shown by a migration measurement of the cemented SP II® Hip Stem using radiostereometric analysis (RSA). In the study, no statistically significant implant translation or rotation with respect to the post-operative radiograph was found in 38 and 27 of 100 patients five and ten years after surgery, respectively. The mean value of the maximum total point movement (MTPM) was stable in both subsequent periods.

In a previous RSA study, the authors had detected a very small but statistically significant distal migration of -0.03±0.17 mm two years after surgery. The initial settlement period was between six and twelve months, with the implant stabilizing after two years. The MTPM then had been 0.99±0.69 mm.

[2] Sesselmann S et al.: Migration measurement of the cemented Lubinus SP II hip stem – a 10-year follow-up using radiostereometric analysis Firenze; Biomed. Eng.-Biomed. Tech. 2017; 62(3):271-278

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