

MAGNEZIX^{M3}

IT HELPS YOU GET FIT AGAIN, FASTER AND SAFER

**THE IMPLANT THAT TURNS INTO BONE - MAGNEZIX[®] OBVIATES
THE NEED FOR A SECOND SURGERY TO REMOVE METAL IMPLANTS**



Intelligent innovations for a better life.
www.syntellix.com

 SYNTELLIX

DOCTORS AND PATIENTS EQUALLY ENTHUSIASTIC ABOUT MAGNEZIX®

An implant, which degrades by itself

START-UP COMPANY FROM HANNOVER WINS INNOVATION PRIZE. PATIENTS DON'T NEED SECOND OPERATION.



Kerstin Pape (29) had a painful foot, a bunion.

A new bone screw saved me from a second surgery.

“I USE THESE SCREWS BECAUSE THEY OFFER GOOD HANDLING AND PATIENTS DO NOT SUFFER THE STRESS OF A SECOND OPERATION FOR METAL REMOVAL.”

DR. MED. BERND HINKENJANN, BOCHOLT

The screw which disappears

CAPIO-ELBE-JEETZEL CLINIC USES REVOLUTIONARY BONE-HEALING METHOD

“THE RESULTS WITH MAGNESIUM SCREWS ARE OUTSTANDING AND SURPRISE BOTH PATIENTS AND MYSELF, AGAIN AND AGAIN.”

DR. MED. CHRISTOPH JASCHKE, WALDKIRCH



MODERN IMPLANT

Today's experts work with magnesium instead of titanium.

MADE IN HANNOVER
This screw is a medical sensation

BILD HANNOVER

“The critical difference is however, that the minerals are degraded in the body and also stimulate bone growth and provide materials to build more stable bones,”

EXPLAINS DR. KLAUSER.

“WE APPLY MAGNEZIX® WITH SUCCESS, BECAUSE MEDICAL ADVANCES SHOULD BE AVAILABLE TO ALL PATIENTS.”

DR. MED. ARND ROLLER, FELLBACH

YOU DESERVE THE MOST INNOVATIVE IMPLANT

DEAR PATIENTS,

As you know, you are scheduled to have a surgery soon in which an implant is to be emplaced. You have perhaps been thinking about this, or worrying because every surgery is always associated with a number of risks. In many surgical treatments of bones, it is a standard procedure to use implants made of steel or titanium, which either remain in the body as foreign material after healing, or have to be removed in a second surgery because they can cause undesired reactions such as pain and inflammation, among others. In other cases, screws made of degradable polymers (based on sugar or lactic acids) are implanted, but these implants lack sufficient stability and are known to cause foreign body reactions and allergies in many cases.

BUT THAT WAS YESTERDAY!

The use of the revolutionary MAGNEZIX® implants eliminate the need for a second surgery for implant removal and all the associated risks (infection, anesthesia) and stress for you as a patient.

Transformable MAGNEZIX® [ma'gneziks] implants are made of magnesium: although magnesium is a metal, meaning it is very stable, these implants degrade over time and convert into bone. This makes MAGNEZIX® implants absolutely unique and set new standards in surgery!

REVOLUTIONARY, FUTURE-PROOF, SAFE - MAGNEZIX®

MAGNEZIX® CS



MAGNEZIX® CS^c



MAGNEZIX® Pin



MAGNEZIX® CBS



MAGNEZIX® StarFuse®










CONVINCING ARGUMENTS - MAGNEZIX® AT A GLANCE

- MAGNEZIX® implants are the **world's first** magnesium-based implants approved for orthopedics and traumatology.
- During degradation, magnesium creates an antibacterial, **infection-inhibiting milieu**.
- **No allergies** are known.
- MAGNEZIX® implants **stimulate bone growth** and are transformed into endogenous bone tissue.
- The **properties are similar to bone**, providing high elasticity and stability.
- The controlled degradation of MAGNEZIX® **obviates the need for a second operation** to remove the metal and no foreign materials are left in the body.

Syntellix AG is an internationally active medical technology company based in Germany specialised in the research, development and sales of self-degrading metallic implants made of magnesium. The material MAGNEZIX® and the implants made from it have already received several awards from experts and patients, including: the Innovation Prize of the German Economy 2012/13, the Future Prize of the German Health Care Industry 2016, the German Medical Award 2017, the STEP Award 2017, the award as "Innovator of the Year 2017", the Sustainability Award as "Product of the Year" 2018, and the German Innovation Award in "Gold" in 2019.

IMPLANT REMOVAL – A NECESSARY EVIL – BUT NOT ANY LONGER

Every surgery has its associated risks. The goal must always be to minimise or avoid risks and to help you, as patients, to return to your normal daily/working life as fast and uncomplicated as possible. And what could serve this purpose better than an innovative implant which makes a second surgery to remove the metal simply unnecessary?!

TYPICAL COMPLICATIONS DURING METAL REMOVAL (MR):		
COMPLICATIONS	TYPE OF TREATMENT	COMPLICATION RATE
RENEWED BREAK	Implants of titanium/stainless steel ^{1,2}	 3 - 26%
	MR of implants of titanium/stainless steel, various ^{1,3}	 11.6 - 37%
INFECTIONS	MR ankle ⁴	 14.8%
	MR heel bone ²	 16.3%
	MR of titanium/stainless steel implants general ^{1,5}	 8 - 29%
NERVE DAMAGE	MR lower arm ⁵	 12%
	MR lower arm/elbow (proximal radius) ⁶	 30%


REMOVAL RATE – UP TO **81 %**⁷


NO NEED FOR METAL REMOVAL – FOR YOU THAT MEANS:

THE MAGNEZIX® PRINCIPLE: FIRST HEAL, THEN DISSOLVE!

 **LESS PAIN**

 **FEWER RISKS**
(INFECTION, ANESTHESIA)

 **LESS STRESS, FEWER WORRIES**

 **LESS TIME LOST**
(HOSPITAL DAYS, SICK DAYS OFF WORK)

Sources:

¹ Vos D., Hanson B., Verhofstad M. (2012): Implant removal of osteosynthesis: the Dutch practice. Results of a survey. In: Journal of Trauma Management & Outcomes, 6: 6.
² Evers B. (2004): Indication, timing and complications of plate removal after forearm fractures: results of a metaanalysis including 635 cases. In: J Bone Joint Surg Br, 86: 289.
³ Backes M., Schep N. W., Luitse J. et al. (2015): High Rates of Postoperative Wound Infection Following Elective Implant Removal. In: The Open Orthopaedics Journal, 9: 418-421.
⁴ Backes M., Schep N. W., Luitse J. et al. (2013): Indications for implant removal following intraarticular calcaneal fractures and subsequent complications. In: Foot Ankle Int, 34: 1521-1525.
⁵ Langkamer V. G., Ackroyd C. E. (1990): Removal of forearm plates. A review of the complications. In: J Bone Joint Surg Br, 72: 601-604.
⁶ Maier M., Marzi I. (2013): Frakturen und Folgeschäden. In: Wirth C. J., Mutschler W., Kohn D.: Praxis der Orthopädie und Unfallchirurgie, 3. Aufl.: 148-167.
⁷ Bostman O., Pihlajamäki H. (1996): Routine implant removal after fracture surgery: a potentially reducible consumer of hospital resources in trauma units. In: J Trauma, 41: 846-9.

IMPLANT REMOVAL IS MADE UNNECESSARY

The complications previously listed demonstrate that it is always better to avoid an unnecessary second surgery for implant removal. For certain patient groups, the use of MAGNEZIX® implants is particularly advisable. These include children and adolescents, athletes and elderly people.

MAGNEZIX®: SMALL IMPLANTS, BIG BENEFITS FOR CHILDREN

It is generally acknowledged, and of course also the wish of the parents, that in children and adolescents the implant should be removed after healing, since foreign material remaining in the growing body can cause numerous complications and problems. In young patients in particular, additional surgeries should be avoided whenever possible together with all the associated physical and mental stress of surgery.

MAGNEZIX® implants save you and your child the nerve-racking experience of a second hospital intervention, which often entails children being without their parents and overall is a traumatic experience.

In addition, there is the renewed risk of anesthesia and infection through a second surgery. These negative effects can be drastically minimised by using MAGNEZIX® implants.



Made
in
Germany.

How safe is MAGNEZIX®?

MAGNEZIX® implants are class III (resp. class D) medical devices and are therefore subject to the highest safety standards with the strictest quality requirements. MAGNEZIX® implants are certified and approved by the German Association for Technical Inspection TÜV (CE marking). MAGNEZIX® products are approved in **55 countries** worldwide (as of November 2019) and have already been successfully used ten thousands of times. MAGNEZIX® implants are safe and of the highest quality **"Made in Germany"**. All of our products are exclusively developed in Germany!

QUICK RETURN TO ACTIVE LIFE

Sport is good for your health, but accidents that lead to broken bones can also occur during sport. Forearm and elbow fractures are the most common types of fracture because during a fall, it is an instinctive reflex to try to stop the body with the arms and hands. Likewise, fatigue fractures (stress fractures) can occur as a result of constant physiological loading or overloading of the bone. Metatarsal bones, ankle and tibia are often affected by runners and football players.

Treating sport injuries with MAGNEZIX® implants offers many advantages:

- The controlled degradation of MAGNEZIX® makes a second surgery for **metal removal unnecessary** and no foreign materials remain in the body.
- The **bone-like properties** mean there is no loss of bone during immobilisation.
- MAGNEZIX® implants have **metal stability values**.
- MAGNEZIX® implants **stimulate bone growth** and are converted into endogenous bone tissue.
- The degradation of magnesium creates an anti-bacterial, **infection-inhibiting milieu**.
- MAGNEZIX® has **excellent biocompatibility** (tolerance), no allergies are known.

MAGNEZIX® implants can help you have a faster recovery and be back in sports, at work and in everyday life sooner.



Faster
recovery with
MAGNEZIX®

Improve your quality of life with MAGNEZIX®!

Fit and healthy - these attributes no longer only refer to young people! In particular, the topic of quality of life through an active lifestyle is becoming more important for people over 50 years old.

MAGNEZIX® implants help patients to continue this active life even after a surgery and to become active again quickly. These implants are very well tolerated: the main component in MAGNEZIX® is magnesium - an important mineral which is indispensable for many essential bodily functions.

MAGNEZIX[®] – THE IDEAL IMPLANT CAN DO EVEN MORE

MAGNEZIX[®] refers to a magnesium-based material (over 90% Mg content) which, although having metallic properties, is completely transformed in the body and replaced by the **body's own tissue**. The mechanical properties of MAGNEZIX[®] are very similar to those of human bone and the stability is comparable to that of titanium implants! Studies have shown that magnesium alloys have **osteoconductive properties**. This means that they stimulate bone growth.^{8,9} In addition, there is a lower risk of infection since the degradation of magnesium takes place via corrosion (degradation of the metal by the reaction with liquids) and thus, an **anti-bacterial**, alkaline (non-acidic) environment is created in the immediate vicinity of the implant where bacteria is less likely to survive.¹⁰

How does that work? See for yourself: **metal turns into bone!**

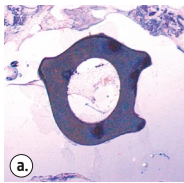


Figure a:
Microscopic view of the tissue section (histological preparation) of an implanted MAGNEZIX[®] CS after a few days.

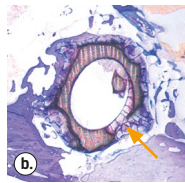


Figure b:
Transformation of MAGNEZIX[®] CS into bony tissue has started after a few months.

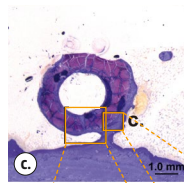
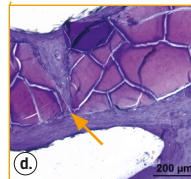
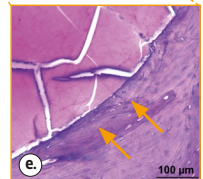


Figure c:
12 months after the OP there has been a full transformation of the metal implant.



Section d:
The new bone formation is visible at the surface of the degraded implant.



Section e:
The presence of bone cells (osteoclasts and osteoblasts) are signs of the transformation process.

Source:

Waizy H., Diekmann J., Weizbauer A. et al. (2014). In vivo study of a biodegradable orthopedic screw (MgYREZr-alloy) in a rabbit model for up to 12 months. In: *J Biomed Appl* 28 (5), 667-75.

Sources:

⁸ Liu et al. (1988): Magnesium directly stimulates osteoblast proliferation. In: *J Bone Miner Res*, 3: 104.

⁹ Zreiqat et al. (2002): Mechanisms of magnesium-stimulated adhesion of osteoblastic cells to commonly used orthopaedic implants. In: *J Biomed Mater Res*, 62(2): 175-84.

¹⁰ Robinson et al. (2010): In vitro antibacterial properties of magnesium metal against *Escherichia coli*, *Pseudomonas aeruginosa* and *Staphylococcus aureus*. In: *Acta Biomaterialia*, 6: 1869-1877.



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*Implants are manufactured in Germany in cooperation with
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