

TissueCareNEWS



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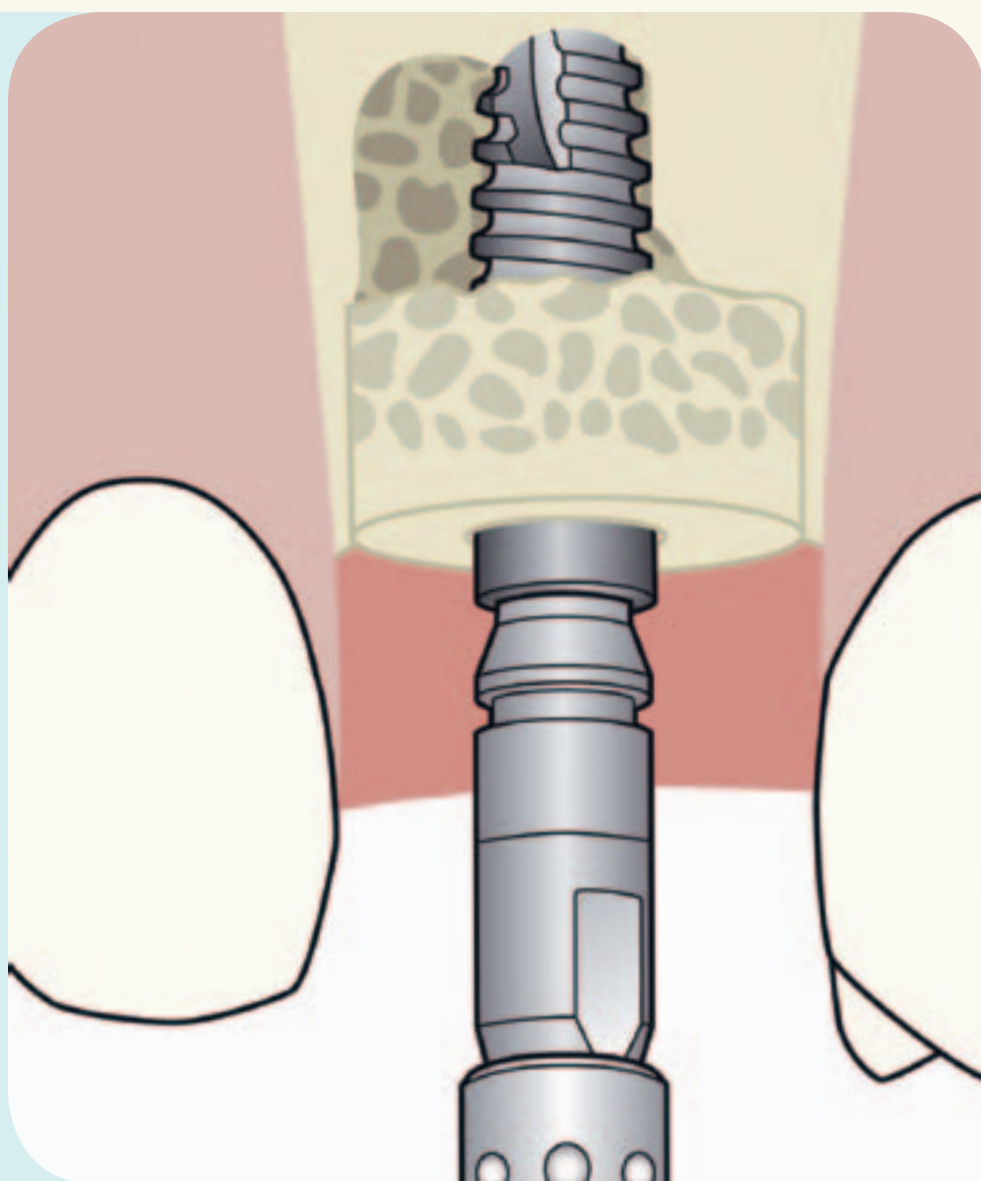
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INTRODUCTION

Dear readers,

It was while treating a patient with a bone defect about six years ago that I first had the idea of using a ring-shaped autogenous bone transplant for augmentation and carrying out the implant placement in the same operation. Over the years I have continued to develop this bone ring technique and use it successfully in the practice. A number of long-term results are now available. My team at the implantology clinic in Melsungen has performed more than 900 augmentations and implant placements with the ANKYLOS® system, the success rate is about 98 percent. We, that is my colleague Dr Orcan Yüksel, who was one of the first to use this technique, and myself, would like to describe this unique procedure to you. We believe that you will be persuaded by its benefits too: Because the bone ring technique spares the patient a second surgical operation and shortens treatment time compared to conventional bone block augmentation around five months. The transplanted ring-shaped bone block serves as the fixation element for the implant. This means, it is no longer necessary to wait for the wound made by fixing the bone block to heal before completing the prosthetics.

This Newsletter includes a step-by-step account of the procedure from the removal of the bone to implant placement, takes a look at the indications and the prerequisites for the bone ring technique and explains why the tissue maintaining TissueCare Concept by ANKYLOS® provides ideal conditions. I would be delighted to welcome you to one of our practice courses, which also include a live operation and a hands-on session.



Once you have had the opportunity to become acquainted with the individual steps of the bone ring technique, seen them in practice application and also performed them yourself, you will also want to

integrate this procedure successfully into your own daily practice.

Yours sincerely Dr Bernhard Giesenhagen

Vertical augmentation and implant placement in just one operation

At a scientific symposium in Frankfurt, Germany on May 28, 2010, the man who developed this special grafting procedure, Dr Bernhard Giesenhagen and Dr Orcan Yüksel – one of the first to use the technique – described how this can be used successfully to treat a bone defect with a three-dimensional vertical augmentation and insert an implant in just one sitting.

As we know, implant placement becomes complicated with an atrophied alveolar ridge or bone defects. The gold standard for vertical bone augmentation is autogenous bone. Bone harvesting is performed either on the chin, palate, hip or retromolar region. This is usually done in a two-stage procedure and is extremely

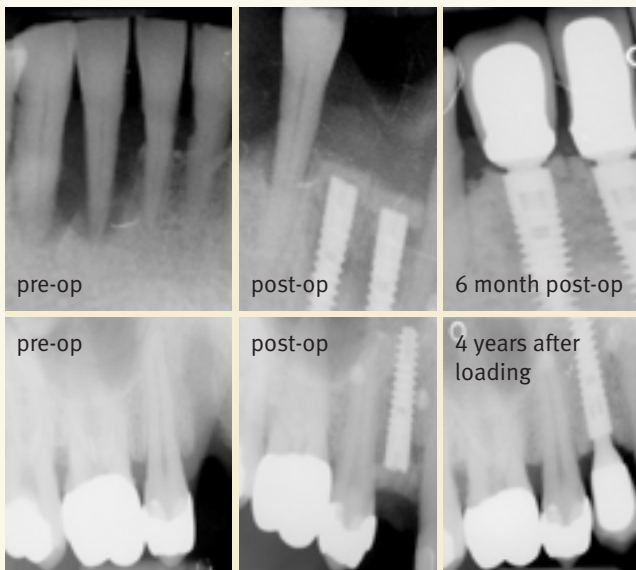
Advantages

“The advantages of this method are obvious” emphasized the creator of the bone ring technique, Dr Bernhard Giesenhagen (Melsungen). “This procedure reduces the overall length of treatment compared to conventional bone block augmentation by about five months.” It is no longer necessary to wait for the bone block to heal. The transplanted ring-shaped bone block serves as the fixation element for the implant. Osseointegration of the implant and the bone block at the receptor site happens simultaneously. Giesenhagen: “In addition to this, the technique also facilitates augmentation and makes it easier for the surgeon to perform the operation.” However, as simple and clear

“A further advantage of this method” explained Yüksel “is the possibility of an exact alignment of the transplant and the receptor site by means of standardized round trephine drills (Helmut Zepf Medizintechnik GmbH).” This ensures that as many vital bone cells as possible come into contact with the cancellous part of the bone ring. Yüksel: “This ensures the best possible conditions for complete revascularization of the transplant.”

ANKYLOS® – the right implant

Patients have an almost certain chance of long-term success with the bone ring technique: the success rate is a convincing 98 percent. This quota is based on more than six years of results and observations.



Practical example demonstrating excellent long-term results thanks to TissueCare Effects by ANKYLOS®

TRAINING COURSE WITH LIVE SURGERY AND HANDS-ON SESSIONS

German:

- Nov. 26/27, 2010 (Frankfurt/Main, Germany)
- March 4/5, 2011 (Frankfurt/Main, Germany)
- May 27/28, 2011 (Frankfurt/Main, Germany)
- Sept. 16/17, 2011 (Frankfurt/Main, Germany)

English:

- April 9/10, 2011 (Frankfurt/Main, Germany)
- Sept. 10/11, 2011 (Frankfurt/Main, Germany)

Further information:
www.bonering.de

taxing for the patient. The bone ring transplantation procedure developed by Dr Bernhard Giesenhagen in 2004 allows the operating surgeon to both augment the bone and insert the implant in just one session.

This novel ‘bone ring technique’ method includes the removal of exact-fitting bone ring transplants, e.g. from the chin or palate region, the subsequent three-dimensional augmentation of the bone defect, as well as the implant placement. (See page 6: “Bone ring technique – step-by-step procedure”)

as the procedure is, the experience of the operating surgeon is still the crucial factor for success. “The key to success is adequate soft tissue treatment” accentuated Giesenhagen. His colleague Dr Orcan Yüksel, who has been performing the bone ring technique with enthusiasm for five years now, added: “It is absolutely essential that the treating doctor is an experienced in dental surgery and periodontics and has already augmented!” This is because tension-free closure of the wound is absolutely essential. The speakers also noted that operations have mostly failed in the past due to suture dehiscence.

More than 900 augmentations were performed with the ANKYLOS® implant system in the implantology clinic in Melsungen during this period. Only nine implants and 21 bone rings failed. Giesenhagen underscored the fact that he works exclusively with ANKYLOS®.

“Treatment protocols show that ANKYLOS® offers the ideal conditions for the success of the technique” said Giesenhagen and Yüksel with conviction. They went on to explain why the proven implant system with the tapered connection, which has been clinically used for more

than 20 years, fullfills all the requirements of the bone ring technique on an implant. "Owing to the progressive thread in the apical region the screw only has to be turned two to three times in the local bone to achieve primary stability." Yüksel: "This fullfills our requirements exactly, as we often have less than three millimeters of bone to work with. In addition, we also need a parallel-walled implant design that, in contrast to the systems with tulip-shaped crestal design, allows the ring transplant to fit exactly around the implant. It is also crucial that there is no thread in the region of the implant neck; otherwise the ring would turn during the final positioning and this would reduce the fit."

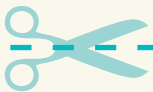
The bone ring is fixed without movement with existing ANKYLOS® membrane screws and the surrounding tissue is sutured tension-free. And, last but not least: the unique ANKYLOS® TissueCare Concept offers a special keyed and friction-locked tapered implant-abutment connection. This prevents micromovement occurring between implant and abutment and precludes

microleakage, which could lead to bacterial colonization and inflammation with possible disintegration of the surrounding hard and soft tissue. That, of course, is the last thing that we would like to happen after successful transplantation! The bacteria-proof connection also allows the implant to be placed subcrestally, an important factor when using a fixing membrane screw. The inbuilt platform-switching, i.e. the inward displacement of the joining microgap, and the microrough implant neck later allow bone to form all the way up to the implant shoulder.

These factors ensure sustainable long-term stability of the hard and soft tissue. Yüksel: "But not all tapered implant systems are suitable. Achieving the desired stability and tightness depends on the ideal length and the angle of the taper. The method described above is the result of a symbiosis between a unique augmentation technique and the ANKYLOS® implant system. It's the key to success in bone ring technology."

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INTERVIEW OF THE DAY **Dr Bernhard Giesenhagen and Dr Orcan Yüksel**



Dr Giesenhagen, Dr Yüksel, which dentists belong to the target group for the bone ring technique?

Yüksel: We are basically addressing all dentists placing implants. The question is, which of these will be successful! I strongly believe that to react efficiently during the course of treatment anyone wishing to perform the bone ring technique must have good knowledge of anatomy. This person must have mastered incision techniques and learned to manipulate soft tissue.

Giesenhagen: Colleagues must know the bones and the different bone qualities. The same applied to soft tissue. This means, they have to have a good command of all aspects of periodontal surgery. In my opinion, these are essential requirements not only for successful implant placement, but also for successful augmentation.

Does the treating doctor have to be an oral surgeon?

Giesenhagen and Yüksel: No, not necessarily. But everyone placing implants must be well versed in bones and soft tissue. Our target group comprises surgeons and dentists with experienced in implants.

What learning curve can participants expect?

Yüksel: If a candidate has the qualifications I have just named, I would recommend beginning with a theoretical course to gain an understanding of the technique. This should be followed by a one-and-a-half-day practical course with live surgery and hands-on sessions.

Giesenhagen: Ideal would be a postgraduate course in implantology, and I would also recommend visiting a human cadaver course. This not only serves as an anatomy refresher course, but also allows the bone ring technique or sinus floor elevation to be practiced on human specimens. (For further information visit www.bonering.de)

Yüksel: Before performing the bone ring technique for the first time it is important to have taken part in at least one of the practical courses. The course deals in detail with the key factors for the treatment success, as well as the risks involved in the bone ring technique.

Do you offer supervision sessions for those using the technique for the first time?

Giesenhagen: Yes, we do. Colleagues can bring their patients to our clinic and perform their first bone ring operation under our direct supervision.

Which indication would you recommend as being particularly suitable for a first operation?

Giesenhagen: That would be the maxilla in the region of the first or second premolar. In my experience bone defects in this area not only have a vertical but also a lateral limitation.

Yüksel: I also think that the mandible with periodontally damaged incisors, heavy bone resorption and long canines would be a good place to start. First, extract the teeth, place two bone rings and two implants, then a four-unit bridge – the risk of failure is extremely low.

What was the first case on which you used the bone ring technique?

Giesenhagen: I treated a edentulous mandible with severe bone defects in the canine region. This was of course an excellent starting situation for a first case; a patient that only needed four implants for an overdenture.

Yüksel: My first case was quite challenging. It was an incisor with a five-millimeter ring. But I managed to achieve good results – thanks to my colleague Dr Giesenhagen who had practiced with me the day before ...

Giesenhagen: An experienced surgeon is capable of taking on the more complicated and challenging cases straight away ...

Why have operations failed in the past years?

Yüksel: One of the reasons is contamination of the bone block: there are more than 300 different bacteria in the oral cavity.

Another reason could be overheating of the bone, or insufficient soft tissue closure, or instable bone ring apposition.

Giesenhagen: Unfortunately, there is no 100 percent success rate.

How long does an operation take?

Giesenhagen and Yüksel: We do not need more than thirty minutes, and we have discovered that it is quicker to remove bone from the palatal region than from the chin. Although there are hygienic reasons for closing the wound and suturing the flap as soon as possible, speed does not really play a decisive role.

What about your scheduling protocol for the diagnostic imaging procedure?

Giesenhagen: In 99 percent of cases, two-dimensional diagnostic image provides sufficient information. For the remaining one percent a DVT (digital volume tomography) is necessary to ensure that the course of the mandibular canal is correctly determined. But in most cases, I expose the site, take a good look at the defect and then know what has to be done. My eye is my third dimension.

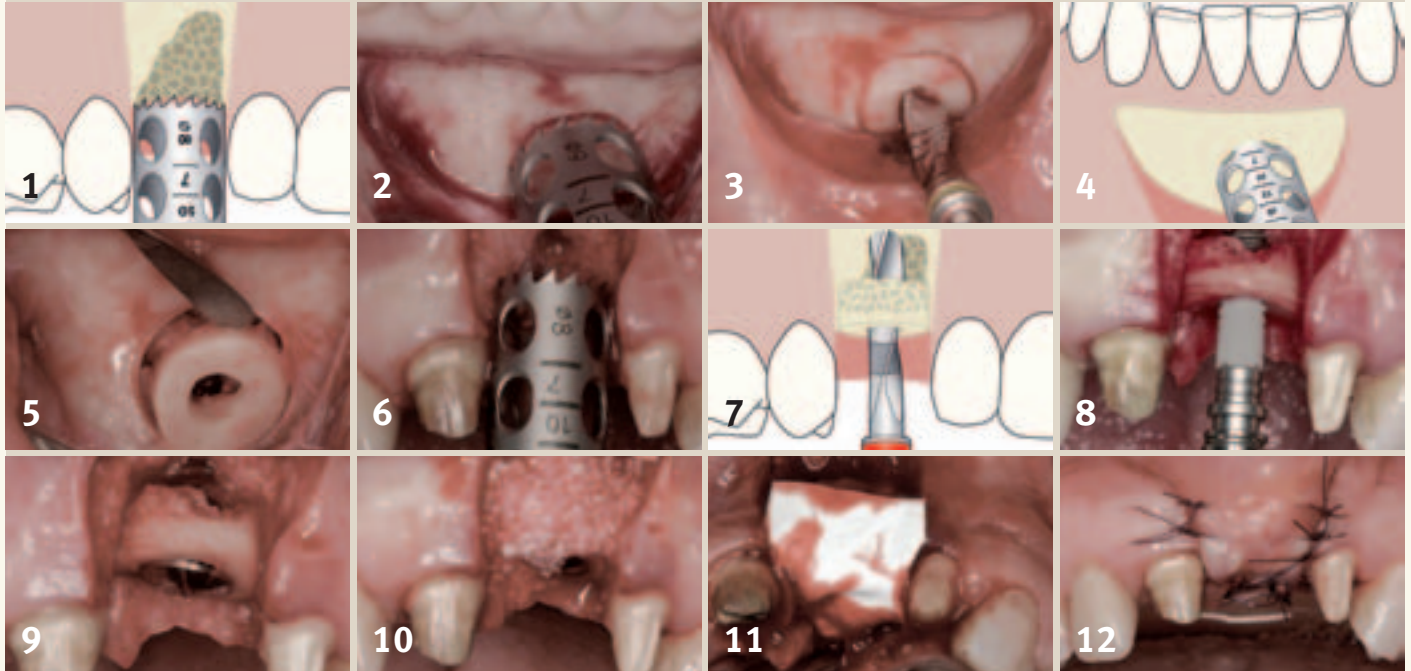
Yüksel: That's how I work too. Years of experience have given the necessary degree of confidence. But at the same time we are also working on developing the bone ring technique using 3D imaging.

How many people are currently using the bone ring technique successfully?

Giesenhagen: I don't know the exact figure, but at a guess I'd say around 80 at international and 30 at national level. Implantologists from the Far East are often on our courses. One of the problems there is the delicate bone structure of the patients; this complicates things. But we haven't entered the US market at all yet for example. As far as that goes, dissemination of our method is still at the pioneering stage.

Many thanks for the interview.

12 steps at a glance



1 | Measure the defect with a trephine drill.

2 | Expose the removal site on the chin and trace the ring with the trephine drill.

3 | Drill the implant site while the transplant is still firmly anchored in the bone. If the cortical bone substance is very hard, only expand the cortical bone with the next sized Tri-Spade drill.

4 | Prepare the final depth of the bone ring with the trephine drill.

5 | Detach the cancellous bone from the cortical bone using the ring cutter, then remove the bone ring transplant using the ring lifter.

6 | Use the trephine drill to prepare the defect at the receptor site for fitting the transplant.

7 | Insert the bone transplant and drill through the bone ring into the local bone of the implant site.

8 | Insert the implant subcrestally through the bone ring.

9 | In case of insufficient primary stability fix the transplant and the implant with a membrane screw.

10 | To prevent adaptation resorption fill the remaining defect volume with autogenous bone chips and non-absorbable bone regeneration material.

11 | Cover receptor site with absorbable collagen membrane.

12 | Suture soft tissue tension-free.

Standard protocol medication

Treatment with full anesthetic

- 30 milligram Prednisolon;
- Spicef iv; Diclofenac and postoperative antibiotics

Treatment with local anesthetic

- 50 milligram Decortin H; one to two days preoperative Clindamycin; postoperative Diclofenac and pain reliever

Provided the crucial factors and the recommended treatment protocol are observed during surgery, the ring technique is suitable for all indications with two or three dimensional bone defects, from severely atrophied mandible, to single-tooth and multiple gaps, to sinus floor elevation. Sole exception is in the case of a very narrow alveolar ridge.

Giesenhagen: "The bone ring technique is a particularly effective method of anatomical contouring of the jaw in the esthetically relevant anterior region. It produces exceptionally good esthetic results."

Bone ring technique — step-by-step procedure

Twelve decisive steps lead to successful and convincing esthetic results (see box “12 steps at a glance”). The man who developed the unique one-stage bone ring technique, Dr Bernhard Giesenhagen (Melsungen), gives a step-by-step guide to the procedure.

“First, I measure the defect with the trephine drill (s. Box 1). A gap of about one millimeter must be left between it and the adjacent tooth” explains Giesenhagen. Possible donor sites are basically the chin region, the palate and the retro-molar region.

Preparation of the removal site

“Owing to the quality and volume of the bone, the chin region is especially suitable. I can remove four to five rings from this region. It’s best to use a T-incision so as not to damage the nervus mentalis. I then prepare the musculus mentalis and the periosteum to the edge of the chin. It is important to stay three millimeters away from both to the tips of the roots and the edge of the chin.” Otherwise the result could be deficient healing and altered physiognomy. Giesenhagen now prefers to remove bone from the palate: “It’s quicker and there is no danger of postoperative paresthesias.”

“I expose the removal site and trace the bone ring by drilling to a depth of approximately half a millimeter with a standard trephine drill (see illustration 2 in box), which I developed in collaboration with the firm Helmut Zepf.”

If the ring-shaped transplant is six millimeters in diameter, then the diameter of the trephine drill for the removal site should be one millimeter more, in this case, seven millimeters. “Both drills must telescope into each other” the speaker stressed. “That is the only way to ensure the required exact press fit of the transplant at the later stage.”

Preparing the implant site — removing the bone ring

The implant site is prepared within the pre-marked ring using instruments for the ANKYLOS® implant system (illustration 3 in box). “I use this to enter the cortical

bone substance, the inner diameter of the ring fits the diameter of the implant exactly.” This requires extreme care, as under no circumstances may the cortical bone be perforated on the lingual side (contralateral cortical bone): “The drill passes easily through cancellous bone and when it reaches the contralateral bone there is noticeable resistance.”

“I then drill the final core with the trephine drill (illustration 4 in box). A good spray coolant must be used to avoid overheating the bone. It is also advisable to work intermittently and with low revolutions – max. 200 per minute.”

The cancellous bone is then detached from the cortical lingual bone using the ring cutter, and the bone ring is removed with the ring lifter (both instruments: company Helmut Zepf), (illustration 5 in box). “This requires a certain amount of patience. A small cracking sound lets me know that the bone block can be lifted out; and I then place it for safe keeping in the lidded container that is waiting on the tray.”

Giesenhagen also points out the danger of the bone ring actually “jumping out”. To avoid this happening an assistant should cover the removal site slightly.

Customize the bone ring — insert the implant

The next step is preparing the defect for fitting the transplant at the receptor site with a trephine drill. The depth to which this is done depends on the bone level of the adjacent teeth. Giesenhagen: “Of course, the diameter and length of the implant have to be determined in advance. I use the bone ring as a drill guide.” The press fit ensures that the transplant is firmly fixed. This is prerequisite for the preparation of the implant site through the ring, as required by the protocol.

The fact that the parallel-walled design of the ANKYLOS® implant has no thread in the neck region ensures the transplant fits securely around the implant and the bone ring does not turn for the final three millimeters when the implant is placed (illustration 7 in box). The implant is inserted subcrest-

ally through the bone ring (illustration 8 in box). This allows bone to grow all the way up to the implant shoulder, which provides additional stability. The progressive thread toward the apical region ensures the required degree of primary stability in the cancellous bone. If there is insufficient primary stability the transplant and the implant can be fixed with the aid of the membrane screw from the ANKYLOS® range of products (illustration 9 in box).

To combat adaptation resorption the remaining defect volume is filled with autogenous bone chips and non-absorbable bone regeneration material (illustration 10 in box). The recipient site is then covered with an absorbable collagen membrane that is held in place with membrane pins (FRIOS® by DENTSPLY Friadent) (illustration 11 in box).

Wound closure — summary

One of the key criteria for the success of the treatment protocol is the tension-free closure of the wound (illustration 12 in box). “As it is absolutely crucial that the wound remains closed, to prevent dehiscence it may be necessary to deepithelialize the skin around the wound a second time. At the end of the day, successes or failure depends on the suture!”

The bad news for the patient is: “For four weeks following the operation, the patient is only allowed to eat soft foods.” The implants are exposed after six months and the prosthetics are fitted. Giesenhagen: “The bone ring technique spares patients a second operation and reduces healing time to around five months — and it ensures sure and repeatable successes. I strongly recommend using the ANKYLOS® system for ensuring successful bone ring technique with the lowest possible risk. In addition, the results of my long-term observations have impressively demonstrated just how stable the bone remains thanks to the ANKYLOS® Tissue-Care Concept.” (See *Practical Examples on page 2*)