

News 2 | 05

New Products from AO Development

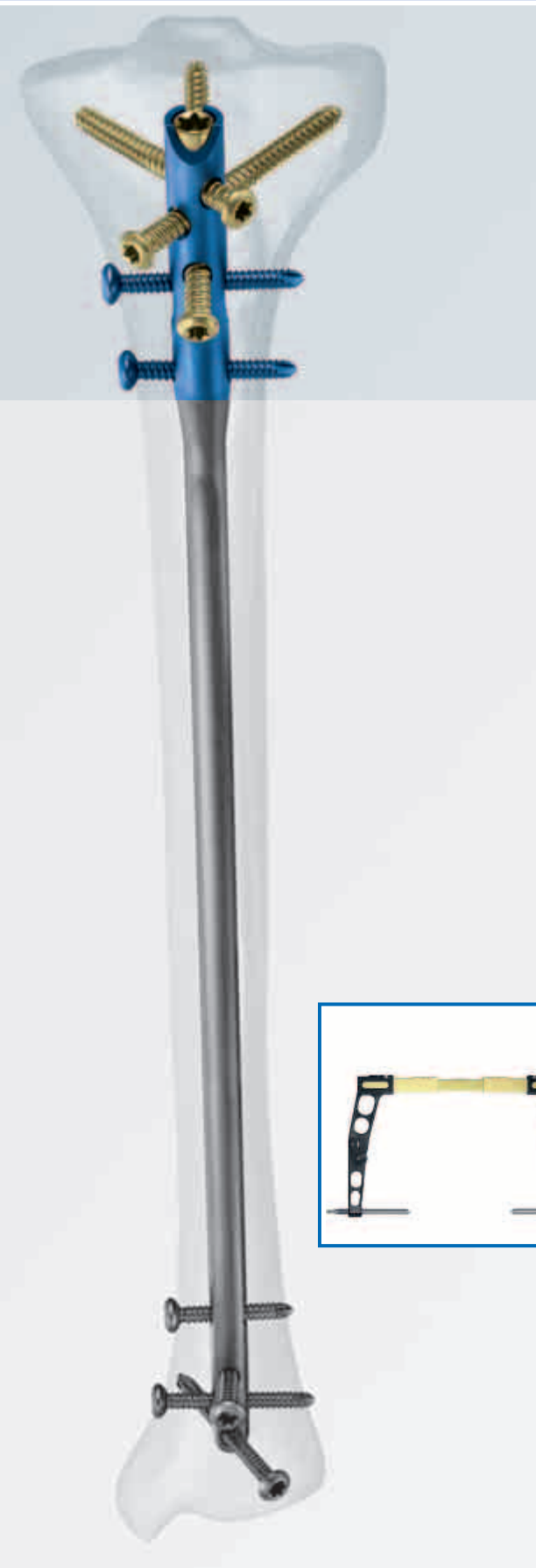


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Dear reader,

the Pelvic Expert Group of the AO Foundation and our Synthes partner have worked very hard in the last years to develop a complete set for pelvic surgery, the Low Profile Pelvic Set. Tim Pohlemann, the long-standing chairman of this group and Keith Mayo, his successor will introduce its main features in our lead article.

In the last issue of the TK News, you were informed about the new Proximal Femoral Nail Antirotational (PFNA) and the new Ti Cannulated Humeral Nail which replaces the UHN. In this issue you will read about the Expert Tibial Nail which is the next generation CTN/UTN. The new Expert Retrograde/Antegrade Femoral Nail (R/AFN) is an alternative to the Distal Femoral Nail (DFN). Together with the Expert Lateral Femoral Entry Nail which is currently under clinical investigation, the new Expert Nail Family will be complete. The Reamer Irrigator Aspirator System (RIA) reduces the intramedullary pressure and has some other clinical relevant features for nailing procedures.

In spine surgery, many new devices for the existing systems have been developed to further improve handling and provide options for specific anatomical situations.

In craniomaxillofacial surgery, the external midface distractor system provides a treatment

for patients with congenital craniofacial anomalies with severe midface retrusions and patients with cleft lip and palate as a secondary procedure in their teenage years.

The Sternal Fixation System is intended for surgical procedures which require splitting the sternum to enter the thoracic cavity and allows easy reaccess if necessary.

The column portrait features a spine surgeon from the US, Dr Daniel Gelb, who has been involved in several new developments for spinal surgery. I like to encourage you to approach the AO if you have an idea for the improvement of patient treatment as he did.

Since AO Dialogue is now published more than twice a year we will produce three issues of the TK News starting in 2006. One issue will focus on new CMF techniques and information around these, one on spine and one on trauma. This focus reflects the increasing specialization of surgeons and clinics worldwide.

Once again, I would like to stress that none of the product descriptions in this publication is a substitute for the AO's surgical techniques or the AO teaching tools. You can obtain more detailed information on these products from the AO or your local SYNTHES® representative.

If you have any comments or questions on the articles or the new products, please don't hesitate to contact me.

Yours faithfully,

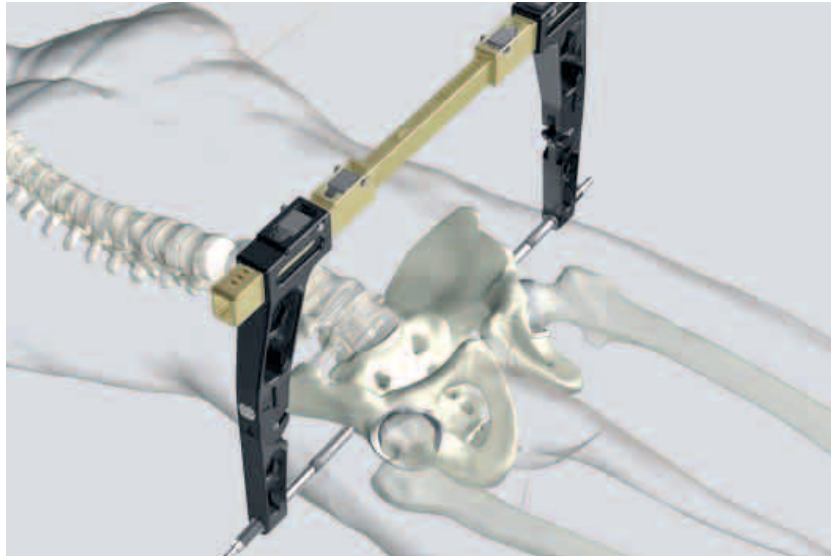
Norbert P Haas

T Pohlemann and K Mayo

THE NEW PELVIC SET

Introduction

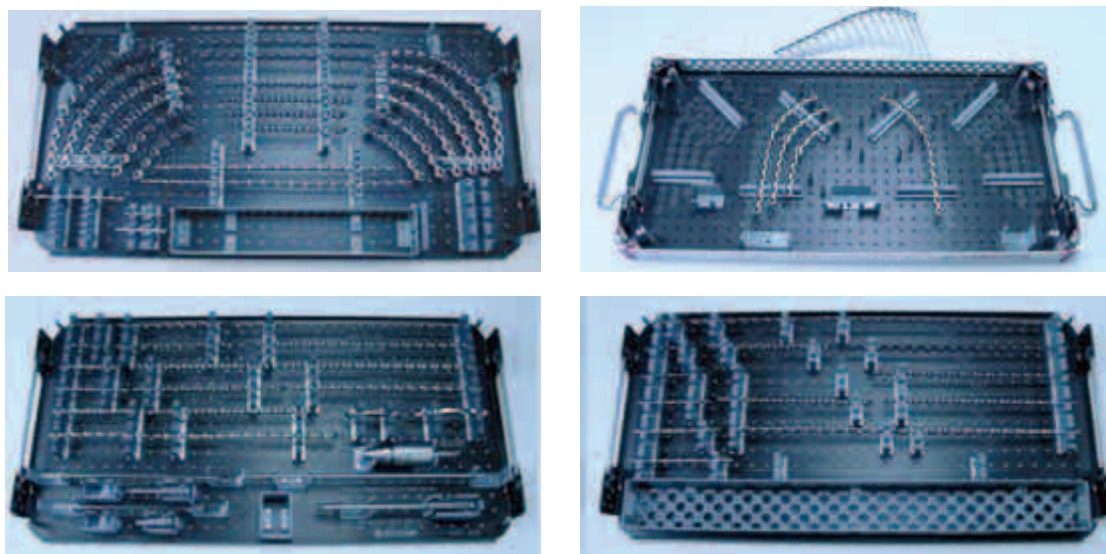
The introduction of wide spread surgical techniques for the operative treatment of pelvic and acetabular fractures started in the late 1960s. Not only questions about indications, approaches, techniques of reduction, and stabilization had to be solved, but the lack of adapted instruments for exposure and reduction made surgery difficult and frequently unpredictable. With the tremendous achievements of pioneer's like E Letournel, M Tile, and several other surgeons, consensus about indications and techniques could be reached. Also, various implants, and even more importantly, adapted instruments for reduction and preliminary fixation were introduced. This made pelvic and acetabular surgery accessible to a wider group of surgeons. Several specialized centers around the world are now offering the complete range of pelvic and acetabular reconstructive surgery. Despite the fact that the "classic techniques" still remain the gold standard in respect to surgical strategy, surgeons' performance, and long term results, various adaptations are constantly being made to match the advances in preoperative diagnostics, the need for "reduced invasivity" of the surgical procedure, and the inauguration of new stabilization principles such as locking compression plates.



The completely redesigned pelvic C-clamp comes in a set for emergency pelvic stabilization ready to use out of the box.

The presently available pelvic instruments and implants were developed during the early 80s under the guidance of R Ganz and J Matta. Those instruments and implants allowed a high variety of surgical interventions, both for the treatment of injuries to the pelvic ring and the reconstruction of acetabular fractures. Advances in visualization and tremendous progress towards a better understanding of the anatomy and injury patterns led to modification and refinement in the surgical technique which made it necessary to reevaluate the function and usefulness of every instrument and implant. This process was accompanied by an intense phase of development and testing of new instruments and implants, with the aim of facilitating operational steps (eg, percutaneous screw applications) or improving postoperative mechanical stability when used in the increasing number of patients with decreased bone quality (eg, the interlocking acetabular plates and the locking compression symphysis pubis plate)

The result of this process initiated by the AO Pelvic Expert Group (medical members: T Pohlemann, Homburg/Saar, Germany, K Mayo,



The modular set for pelvic implants. The design of the plates has been modified to allow easier contouring to the patients anatomy, together with optimized screw hole geometry for a wider range of angulations.

Takoma, US, P Rommens, Mainz, Germany, M Oransky, Rome, Italy, and C Sancineto, Buenos Aires, Argentina) can now be presented as a new “Modular Pelvic System”, covering nearly every aspect of pelvic and acetabular surgery. It is composed of four different sets, which can be adjusted to personal or institutional preferences:

1. Emergency stabilization with a “ready to use pelvic C-clamp”;
2. Pelvic and acetabular instrument set with a wide range of standard instruments useful for solving nearly all problems in reduction and preliminary and definitive stabilization;
3. Pelvic and acetabular implant set with improved, anatomically oriented plate designs and a new set of locking compression acetabular and pubic symphysis plates;
4. An additional set according to the surgeon’s personal preferences such as “percutaneous screw insertion”, “collinear reduction forceps”, special retractors, and other instruments useful for specific techniques.

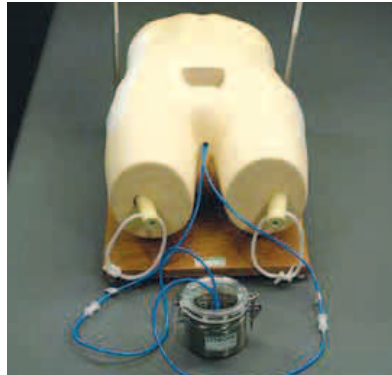
With this modular pelvic system a perfect combination between the demands for standardization of instruments and implants and the individual needs of the surgeon’s preferences could be realized. Grounded in the classical AO tradition, the modular pelvic system is supported by new concepts of teaching introduced in the AO pelvic courses, based on the differentiation of “emergency and basic techniques” and “advanced and specialist techniques”. The effective use of instruments and implants, clear and reliable concepts for emergency situations, elective pelvic and acetabular reconstructions and even more important concepts of analyses, decision making, and surgical planning are all introduced.

For a clinical case please see page 33.

Components of the Modular Pelvic System

1. Emergency treatment of unstable pelvic ring injuries with unstable circulation

The first module is assigned to the emergency stabilization of unstable pelvic ring injuries in combination with haemodynamic instability. The C-clamp, according to the proposals of R Ganz, has been redesigned and is now a ready to use device with a modified application modus, which allows a more controlled application even in emergency situations. A special “training mannequin” has been developed, which is useful for individual and group “drill training” within hospitals.



The “pelvic trainer” allows for individual and team training for C-clamp application. Although emergency situations after pelvic injuries are rare, they can be life threatening. As such, not only teaching sessions, but also regular training drills are recommended.

2. Pelvic and acetabular surgery instruments

The second module carries the standard instruments for pelvic and acetabular surgery. Both retractors and reduction instruments have been redesigned or complemented when necessary. They allow for all standard procedures for pelvic and acetabular surgery.



The “new C-clamp”. Using a special “entry finder”, the optimal entry side is secured with a K-wire, which facilitates the clamp positioning in emergency situations and increases overall safety.

3. Pelvic and acetabular surgery implants

The third module holds all necessary implants for pelvic and acetabular surgery. The use of 3.5 mm pelvic screws with modified hex depth allows secure tightening and removal in long lengths. New pelvic plates have been introduced with an optimized design and screw hole geometry. Keeping the stability of the pelvic reconstruction plates, their smoothed outline allows safer and easier introduction underneath soft tissues. The screw hole geometry allows a wider range of screw angulations and the whole plate is easier to contour for speeding up the application process. The shape of the plates has been adapted to more closely fit the pelvic anatomy (“J-plate”), and as such, only minimal adjustments have to be made to fit to the individual anatomy. For further information please see page 26 and 27.



Retractors.



Reduction instruments.



3.5 mm pelvic screws are self-tapping and have a deepened hex for better fixation of the screw driver even in very long screw length. An optimized grip with the locking screw driver facilitates percutaneous screw insertions.



Comparison of the “new pelvic plates” in low profile and wide angle design. Note the different outline in a so called “J-shape” for optimal fit to the pelvic brim and the new screw hole geometry. The plates are optimized for contouring to the bone surface and sliding beneath soft tissues.



An interlocking version is introduced for the first time for acetabular stabilization. This takes into account the rapidly rising number of geriatric patients and patients with decreased bone quality with acetabular fractures.



Close-up view of the new pubic symphysis plate. Note the interlocking options with fixed screw directions for optimized hold and fixation options for reattachment of the rectus abdominis muscle.

For the first time an locking compression stabilization system is introduced in pelvic stabilization, taking into account the rapidly rising number of geriatric patients with the need for acetabular reconstruction. These plates will also provide increased safety in difficult situations with significant decrease of bone quality. The pubic symphysis plates allow for dynamic compression as well as for the use of locking head screws, and is anatomically adapted to the specific requirements of the anterior pelvic ring. To facilitate the reattachment of the frequently disrupted rectus muscle additional holes for holding sutures have been added.

4. Pelvic and acetabular surgery optional instruments

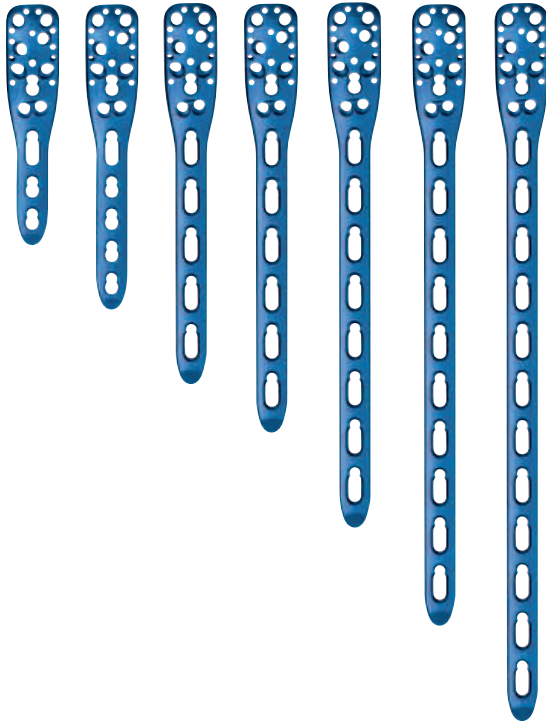
A fourth module is available for the selection of specific and specialized instruments according to the individual surgeon's preferences and demands. This could be the collinear reduction system, the 7.3 mm cannulated screws with the oscillation 2.8 mm drill guide for percutaneous transiliosacral screw fixations, or further instruments.

Summary

The new Modular Pelvic Set will provide a wide range of specialized instruments and implants suitable for nearly all presently available modern techniques in pelvic and acetabular surgery. Standard, reliable stabilizations as well as sophisticated reduced invasive procedures can be covered according to the surgeons and institutions knowledge and infrastructure. The modular set-up provides an easy adaptation to further techniques like image guided and navigated surgery. In conjunction with the well known AO teaching concept, a choice of instruments and implants are now available, which are specially adapted to pelvic and acetabular surgery.

Brett Bolhofer, Jesse Jupiter, Norbert Südkamp

NEW UPPER EXTREMITY PRODUCTS



PHILOS long

PHILOS is indicated for the treatment of all kinds of proximal humeral fractures, especially in poor bone. Now, a longer and stronger plate, PHILOS long, has been designed to treat proximal humeral fractures with extension into the shaft, fractures after new trauma just below an osteosynthesis, and nonunions.

The proximal part of the PHILOS long is identical to the standard plate. This ensures 100% compatibility of all existing PHILOS instruments. It also ensures that the surgeon can use exactly the same surgical technique for the proximal part as for the standard PHILOS.

The entire shaft of PHILOS long is equipped with long holes. This allows maximal flexibility for both the lag screws for the reduction of the fracture and the locking head screws for angular stable fixation. It is recommended to use locking head screws in the shaft to reach maximum stability.

PHILOS long is reinforced significantly over the standard PHILOS and the LCP T-Plate. Increase in strength is about 50%. Plate undercuts improve vascularization of the periost by reducing contact between implant and bone. A bullet tip has been added to allow easier application of the minimally invasive surgical technique.

PHILOS long is available in titanium and stainless steel.

87-year-old woman fell down the stairs, fracture type 12-C1.



Fig 1
Preoperative x-ray.

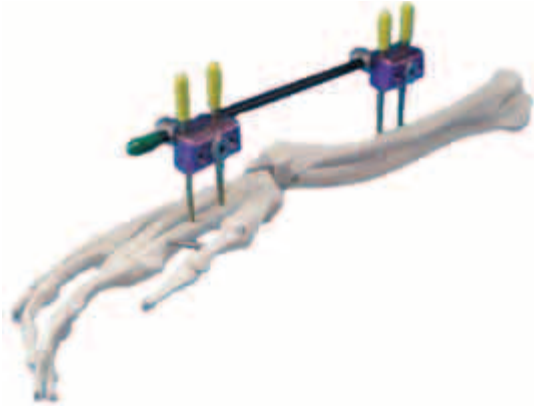


Fig 2
Postoperative x-ray.



Fig 3
Follow-up after 6 months.

With kind permission of Michael Plecko, MD.



Low profile distal radius fixator

The low profile distal radius fixator is similar to the distal radius fixator (DRF) in function, but is simpler in design and has a lower profile. The low profile distal radius fixator is a 6 mm carbon fiber rod system, as compared to the 8 mm carbon fiber rod system of the DRF.

The low profile distal radius fixator is offered in sterile packaged “kits” including all of the necessary hardware and instrumentation. There are two different options of Schanz screws, 4.0 mm/2.5 mm trocar tip and 4.0 mm/3.0 mm self-drilling. Two different length options of carbon fiber rods, 200 mm and 220 mm, are available. The low profile distal radius fixator comes preassembled in the package.

3.5 mm Ti cortex screws, self-tapping, StarDrive

The 3.5 mm, self-tapping, Ti cortex screws, with StarDrive recess, have the same indications as the existing 3.5 mm Ti cortex screws with hexagonal recess. Since the StarDrive recess is superior to the hexagonal recess, the AO decided to make all existing screws available with StarDrive (see News from AO Development 2-2003, p 17).

The new 3.5 mm Ti cortex screws with StarDrive recess are available in lengths from 10 to 150 mm.



3.5 mm conical screw, self-tapping (line extension)

The 3.5 mm, self-tapping, conical screw is a line extension to the Small Fragment Set. It includes lengths from 40 mm to 95 mm in 5 mm increments. The screws are provided in either stainless steel or titanium. Until now, they were only available as locking head screws. The new conical screw allows for compression across the fracture line. They come in a fully threaded and partially threaded version.

Brett Bolhofer, Martin Hessmann, Dankward Höntzsch, Phil Kregor, Cliff Turen

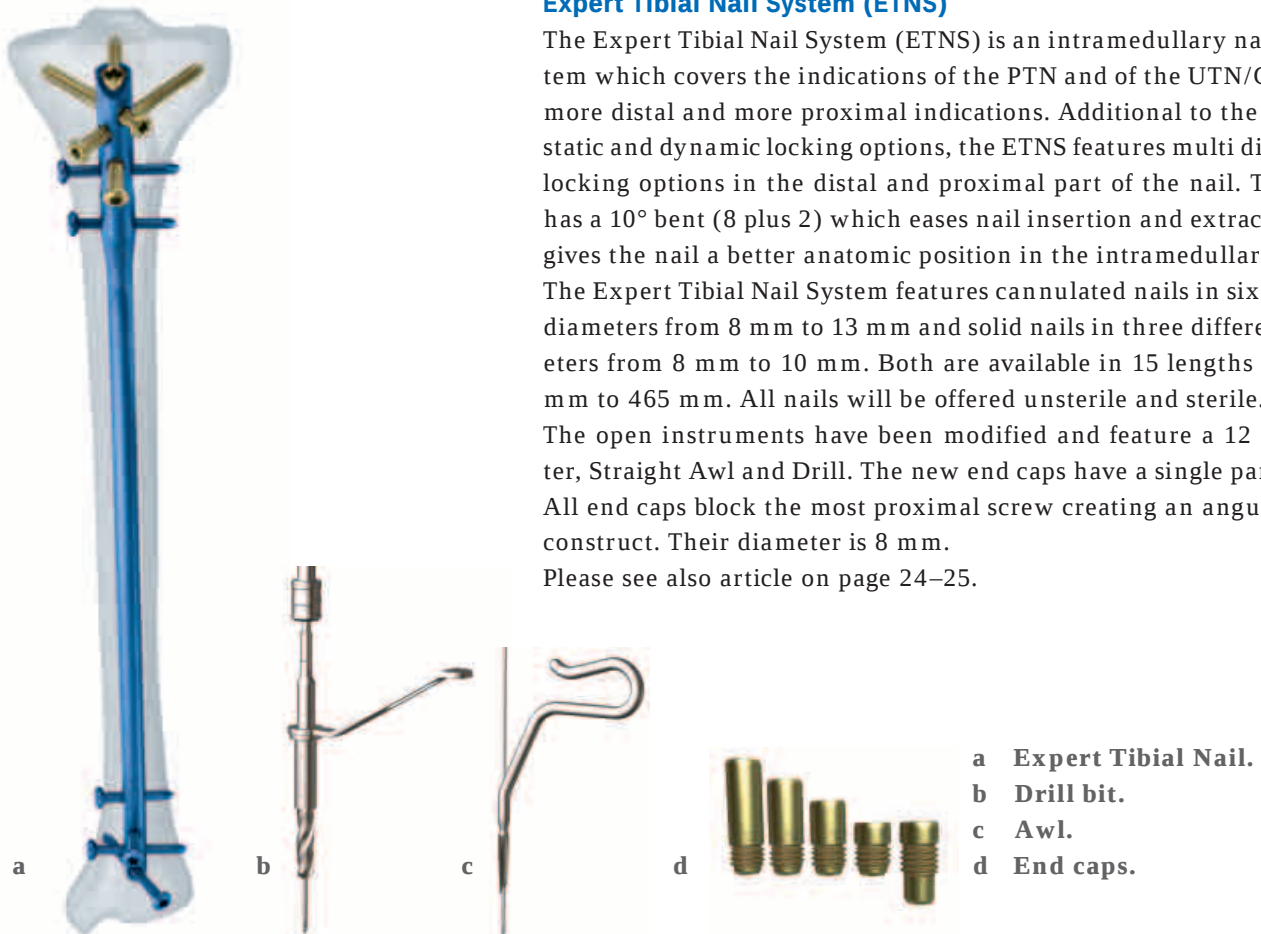
NEW LOWER EXTREMITY PRODUCTS

Expert Tibial Nail System (ETNS)

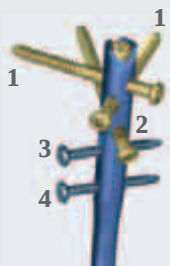
The Expert Tibial Nail System (ETNS) is an intramedullary nailing system which covers the indications of the PTN and of the UTN/CTN, plus more distal and more proximal indications. Additional to the standard static and dynamic locking options, the ETNS features multi directional locking options in the distal and proximal part of the nail. The ETNS has a 10° bent (8 plus 2) which eases nail insertion and extraction, and gives the nail a better anatomic position in the intramedullary canal. The Expert Tibial Nail System features cannulated nails in six different diameters from 8 mm to 13 mm and solid nails in three different diameters from 8 mm to 10 mm. Both are available in 15 lengths from 255 mm to 465 mm. All nails will be offered unsterile and sterile.

The open instruments have been modified and feature a 12 mm Cutter, Straight Awl and Drill. The new end caps have a single part design. All end caps block the most proximal screw creating an angular stable construct. Their diameter is 8 mm.

Please see also article on page 24–25.



Locking options for the Expert Tibial Nail System



1 Two oblique (+/- 40°): 14/20 mm for Ø 5.0 mm monocortical screws.

2 One AP oblique (20°): 30 mm for Ø 5.0 mm monocortical screws.

3 One mediolateral dynamic: 36/43 mm for Ø 4.0 mm respectively Ø 5.0 mm bicortical screws.

4 One mediolateral static: 57 mm for Ø 4.0 mm respectively Ø 5.0 mm bicortical screws.



1 Mediolateral: 37 mm.

2 AP: 22 mm.

3 Mediolateral: 13 mm.

4 One oblique locking option: 5 mm for right/left tibia (+/-30°).

5 All locking options for Ø 4.0 mm resp. Ø 5.0 mm bicortical screws.

64-year-old woman with a type III open distal tibial fracture extending into the pilon and beginning compartment syndrome following a traffic accident and treated with ETNS.

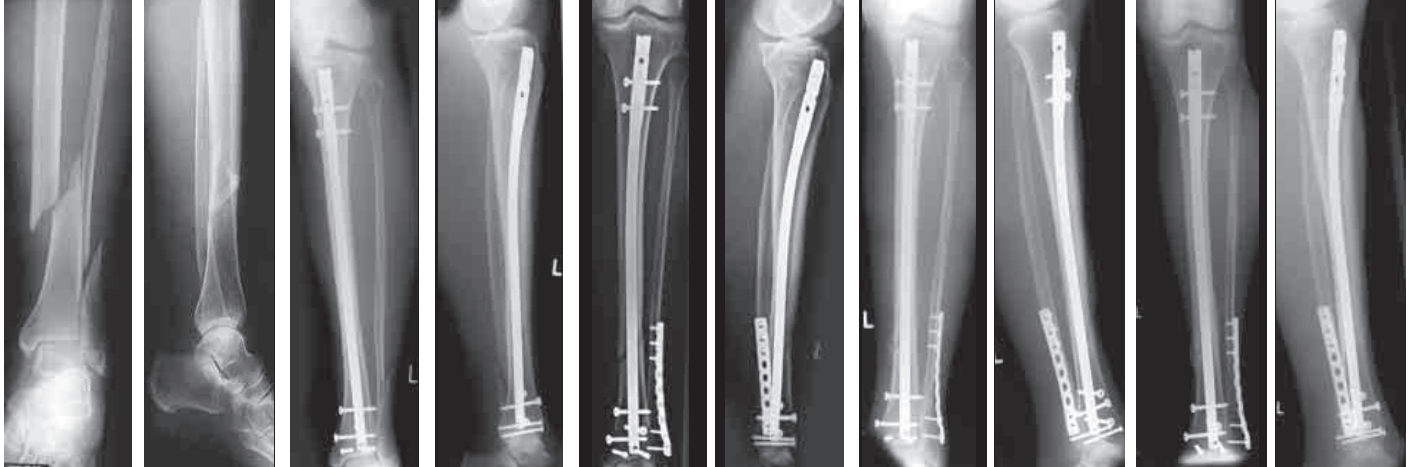


Fig 1
Preoperative x-rays.

Fig 2
X-rays 9 days postoperative. Note: Fixation of the pilon fracture before nail insertion.

Fig 3
Before closing of the dermatofasciotomy plating of the fibula.

Fig 4
X-rays 12 weeks postoperative; full weight bearing.

Fig 5
X-rays 8 months postoperative show complete healing.

47-year-old man with closed 42-C3 fracture following a sports accident treated with ETNS.

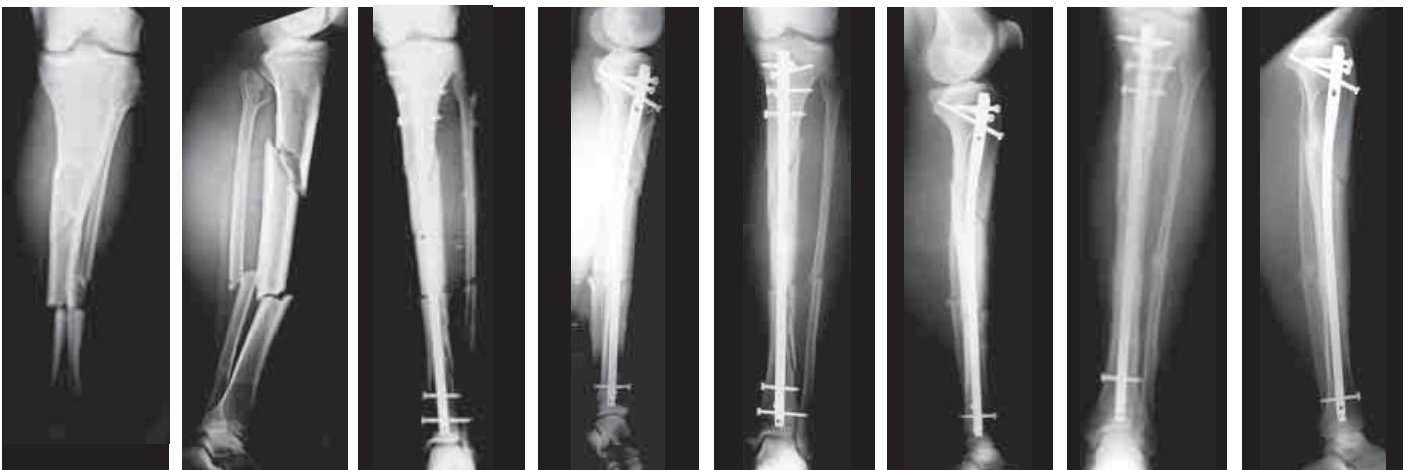


Fig 1
Preoperative x-rays.

Fig 2
Postoperative x-rays.

Fig 3
Postoperative x-rays after 12 weeks.

Fig 4
Healing in progress.



Expert Retrograde/Antegrade Femoral Nail (R/AFN)

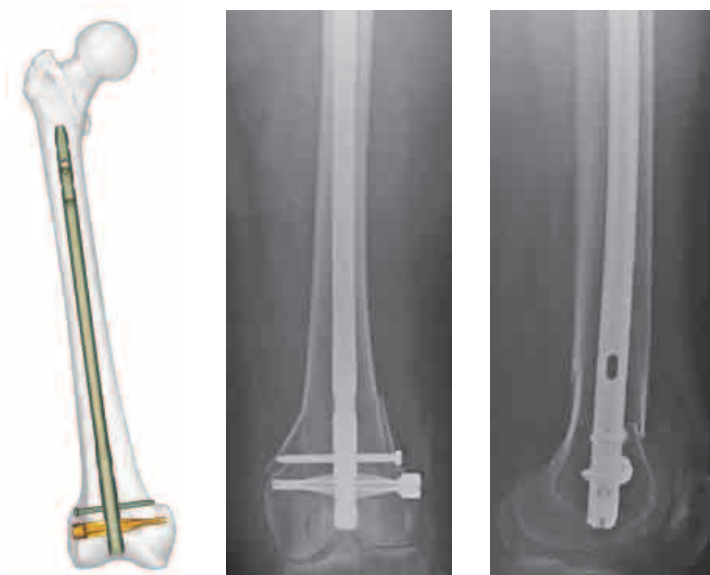
The R/AFN is a cannulated intramedullary nailing system for the treatment of fractures of the distal femur and/or diaphyseal fractures in which a retrograde approach is indicated. The R/AFN also enables fixation of fractures of the femoral shaft with an antegrade approach through the piriformis fossa.

The R/AFN has a universal design for the right or left femur with an anatomic bend (1.5 meter radius of curvature). The locking options include spiral blade and standard locking. Proximal locking holes are optimized for the lengths of the nail. The use of a locking end cap secures the spiral blade or the most distal locking screw in place, creating an angular stable construct which is advantageous for fixation of fractures involving the femoral condyles.

The R/AFN is available in shaft diameters from 9 mm to 15 mm and lengths from 160 mm to 480 mm, in 20 mm increments. Lengths from 160 mm to 280 mm are designed for retrograde insertion only. Lengths from 300 mm to 480 mm can be used for both antegrade and retrograde insertion. 5.0 mm and 6.0 mm Ti locking screws are available with a T25 StarDrive recess.

A newly designed instrument set permits a more percutaneous technique and less tissue stripping.

Compared to the Distal Femoral Nail (DFN), the R/AFN offers additional locking options, allowing also an antegrade approach.



Locking of the R/AFN with spiral blade.

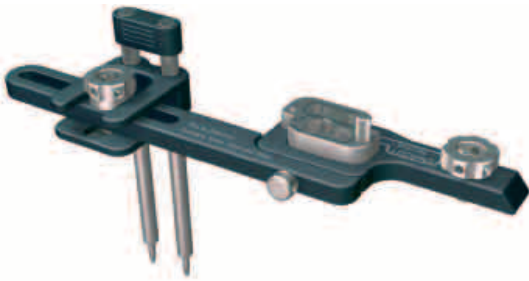


Reamer-Irrigator-Aspirator (RIA)

The Reamer-Irrigator-Aspirator (RIA) is indicated to clear the medullary canal of bone marrow and debris and to effectively size the medullary canal for the acceptance of an intramedullary implant or prosthesis.

The RIA provides irrigation, aspiration, and cooling during reaming, which allow single-pass reaming and reduced intramedullary pressure. Irrigation flows through the drive shaft and reamer head into the medullary canal. This irrigation mixes with the morselized medullary contents and is then removed through the aspiration tube.

The reamer head ranges in size from 12 mm to 16.5 mm in diameter, in 0.5 mm increments. They are sterile packaged and intended for single-patient use. The reamer head is assembled to a disposable tube assembly which comes in two lengths, 360 mm and 520 mm. The tube assembly has a port for irrigation which is connected to saline solution via a standard irrigation set and an aspiration port which is connected to operation room suction using 1/4 suction tubing. The reamer head and the tube assembly are attached to a reusable drive shaft. A plastic seal prevents irrigation from flowing out of the system from the back end of the drive shaft and drive unit, which maximizes irrigation at the reamer head. Several investigations are ongoing to analyze the potential usage of the medullary contents. More information will be provided in the next TK News. Please see also pages 28–29.



Proximal aiming device for DFN

The DFN (Distal Femoral Nail) System is an established retrograde intramedullary nailing system to treat distal and diaphyseal fractures of the femur. The spiral blade locking option and the possibility of angular stable fixation with very distal locking made the DFN popular. However, proximal locking performed free-hand is difficult and time-consuming.

The new proximal aiming device (PAD) improves proximal locking procedures, enabling the surgeon to lock the nail distally and proximally completely without fluorescent X-radiation.

After determination of the nail length the surgeon must calibrate the proximal aiming device to the proposed nail. The proximal guide part leads to the correct location and orientation of the locking holes of the nail. For drilling and screw placement, the proximal guide is used the same way as a normal aiming arm. Compared to the free-hand technique, the PAD offers a simple and effective solution for proximal locking of short DFN's 160, 200, and 240 mm length.

For borderline cases, such as very large or small curvature of the femur, or nail with small diameter, the alignment of the locking hole and the PAD needs to be controlled by x-ray examination before drilling.

Furthermore, a new aiming arm for distal locking is offered.



**Postoperative
x-ray, AP view.**

LCP Dynamical Helical Hip System (LCP DHHS)

The LCP Dynamic Helical Hip System is a stainless steel plate and helical blade construct used to treat stable and unstable intertrochanteric and pertrochanteric fractures. The system can also be used to treat certain basilar neck and subtrochanteric fractures.

A significant feature of the plate portion of the system is the incorporation of a barrel that contains a mechanism which allows the surgeon to lock rotation of the helical blade intraoperatively. This separate “key” allows for the free rotation of the helical blade shaft within the barrel, giving surgeons the opportunity to position and fine tune the placement of the plate along the shaft of the proximal femur. When the desired plate position is achieved, the key can then be activated, lock rotation, and still allow for dynamic compression of the fracture.

As the LCP DHHS system utilizes a helical blade, it is also a significant improvement over traditional hip screws. In mechanical testing, the helical blade has proven to resist rotational and cantilever loads far greater in fatigue and static testing than traditional hip screws. The helical blade requires less bone removal in the femoral head, therefore preserves as much bone around the construct as possible.

The combination of the helical blade and the new LCP side plate create a very stable secure construct which improves upon the original concept of the sliding dynamic hip screw implant.

The plates feature locking compression holes which allow for the use of 5.0 mm locking head screws or 4.5 mm cortex screws. The plate design incorporates a limited contact profile and a tapered end for easier insertion through smaller incisions.

The LCP DHHS is available in a 130° version with 4.5 and 6 holes, as well as a 135°, 140°, and 145° with 2–6 holes each.



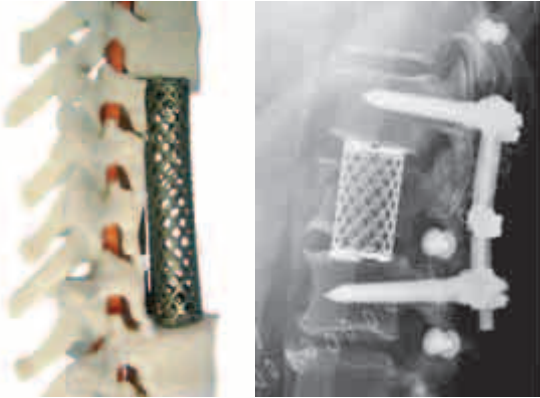
LCP curved condylar plate

The LCP condylar plate is part of the locking periarticular plating system which is indicated for treatment of multifragmentary distal femoral fractures, supracondylar fractures, intraarticular and extraarticular condylar fractures, as well as malunions and nonunions of the distal femur. It also can be used for periprosthetic fractures. The plate head is anatomically shaped to match the distal femur.

The LCP curved condylar plate has the same design as the existing LCP condylar plate except for an anterior-posterior anatomic bow to accommodate the bend of the femoral shaft. The plate shaft is bent with a 1.1 m radius starting after the eighth hole. The LCP curved condylar plate is available in a left and right version and sizes from 10 to 22 holes.

Jens Chapman, Mike Janssen, Paul Pavlov

NEW SPINE PRODUCTS



SynMesh: additional sizes (noncontoured and precontoured)

SynMesh is used for vertebral body replacement in the case of tumor or trauma from T1–L5. Existing sizes are cut to fit in corpectomy sites, which increases OR time. Straight implants in longer vertebral body reconstructions can impinge posteriorly on the spinal cord because they do not follow the normal anatomy.

Therefore, additional heights have been developed to reduce the need to cut down larger sizes and reduce OR time in these cases. The 10 mm diameter SynMesh is now available in heights of 14, 16, 20, 22, 24, and 32 mm, the 12 mm diameter in heights of 14, 16, 20, 22, and 24 mm, and the 15 mm diameter in heights of 18, 20, 22, and 24 mm.

Contoured implants are offered to better fit the anatomy and reduce the likelihood of impingement on the spinal cord. They are available in diameters 12 mm, 15 mm, 17 x 22 mm, 22 x 28 mm, and 26 x 33 mm. The available heights for all diameters are 88 mm and 150 mm.

Axon: line extension

The Axon System is designed for posterior stabilization of the cervical and upper thoracic spine taking into account the variations of patient anatomy. A posterior fusion and stabilization procedure is often used to treat instabilities secondary to traumatic injury, rheumatoid arthritis, ankylosing spondylitis, neoplastic disease, infections, and previous laminectomy.

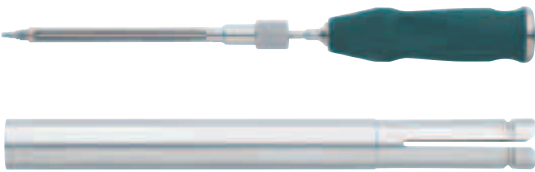
The Axon system is based on the CerviFix/StarLock system. Furthermore, this system allows an extension of a construct from the occiput to the lower spine combining it with the Universal Spine System (USS).

The following enhancements provide additional clinical options to surgeons using the Axon system:

3.5 mm and 4.0 mm screws (28–50 mm thread lengths)

Additional lengths of the 3.5 and 4.0 mm Axon screws in cancellous thread profile are available. The system now provides screws from 8 to 50 mm lengths in 2 mm increments to accommodate varying patient anatomy and different surgical techniques.





2.5 mm hex driver with threaded holding sleeve

The Axon threaded holding sleeve eliminates screw toggle which gives the surgeon the feeling that the screw is an extension of the screwdriver. The 2.5 mm hexagonal screwdriver and the threaded holding sleeve engage the hex recess in the bone screw and the threads in the polyaxial head of the Axon body. The outer slip sleeve freely rotates on the threaded holding sleeve to allow the surgeon to use two hands to direct the screw, and not risk unthreading the holding sleeve from the Axon body during insertion.

3.5 mm Ti hard rods

Longer tapered rods allow the building of constructs that span multiple regions of the spine. Additionally to the existing 300 mm and 500 mm rods, a 700 mm rod is now available in two transition diameters, 3.5/5.0 and 3.5/6.0 mm. The 3.5 mm section is 190 mm in length, the 5.0/6.0 section is 500 mm. Both sizes have a 10 mm transition section.



Low profile transconnector: additional implants and gauge

The Ti low profile transconnector is used to create a stable construct and to reduce rotation in thoracolumbar spine. The transconnector is preassembled and compatible with the USS instrumentation. Three additional sizes with lengths of 33–38 mm, 38–48 mm, and 49–69 mm provide more options. For the selection of the optimal span length, a gauge is now available.

USS reduction instruments

To improve reduction in larger patients using the USS fracture system, a longer reduction sleeve has been developed. It features a demarcated sight window along the side of the sleeve which allows the surgeon to accurately reduce a know distance. The new contoured Knob is larger in size and contoured to reduce soft tissue disturbance.

		Diameters					
		4.2 mm	5.2 mm	6.2 mm	7.0 mm	8.0 mm	9.0 mm
Lengths	25 mm	•	•	•	•	•	
	30 mm	•	•	•	•	•	•
	35 mm	•	•	•	•	•	•
	40 mm	•	•	•	•	•	•
	45 mm		•	•	•	•	•
	50 mm		•	•	•	•	•
	55 mm		•	•	•	•	•
	60 mm			•	•	•	•
	65 mm			•	•	•	•
	70 mm				•	•	•
	75 mm				•	•	•
	80 mm				•	•	•
	90 mm				•	•	•
	100 mm				•	•	•
		New	•	Current	•		•

Click'X, additional diameters and lengths

The Click'X low back system is indicated for posterior stabilization of instabilities and degenerative diseases in the posterior lumbar and sacral spine.

Additional diameters and lengths for the Click'X, dual core, standard or preassembled enlarge the surgeon's options.

The smallest diameter is now 4.2 mm in lengths of 25–40 mm. For the diameters 5.2, 6.2, 7.0, and 8.0 mm, a 25 mm long screw has been introduced for short pedicles.

For procedures where surgeons want to maximize bone screw purchase for sacro-iliac fusions, lengths of 70, 75, 80, 90, and 100 mm are provided in diameters 7.0, 8.0, and 9.0 mm.



248 mm screwdriver and holding sleeve

The new 248 mm screwdriver is used with the Click'X Spondylolisthesis System. It functions as the existing 298 mm screwdriver but provides improved control for smaller patient anatomy. The outer sleeve rotates freely, allowing the surgeon to control the trajectory of screw with minimal drag on the screwdriver shaft.



Anterior tension band: two level symmetrical plates for lumbar and sacral application

The Anterior Tension Band System is a low-profile anterior plating system designed to provide additional fixation across ALIF constructs thereby avoiding a posterior procedure and reducing tissue resection and operative site morbidity.

The system consists of two different plates. The sacral plates are designed for anterior placement across the L5–S1 disc space utilizing a “step” procedure for easy placement on the sacral promontory. The lumbar plates can be placed either directly anterior or anterolaterally from L1–L5 depending on the location of the great vessels. Both plates are prelordosed and offered in 1- and 2-level configurations with varying plate lengths corresponding to our ALIF spacer heights.

To address varying patient anatomy, two level symmetrical plates for both lumbar and sacral plates in lengths from 77 to 109 mm provide the appropriate implant size.

The convergent 5.5 mm, dual core, self-tapping screws increase the resistance to pull-out and lock to the plate in a 1-step locking mechanism. A 5.5 mm Ti cancellous locking head screw with 20 mm thread length and templates for all plates have been added to the system.



Conical extraction screw

The conical extraction screw is designed for the removal of screws with a damaged 3.5 mm hex recess, eg, with use of the Thoracic Spine Locking Plate (TSLP) or the Anterior Tension Band System. Its length accommodates the depth of anterior thoracolumbar procedures.



CSLP: distractor pin

Distractor pins are used intraoperatively to distract the motion segment, especially in disectomy cases.

Until now, the Ti distractor pins were offered in lengths of 14, 16, and 18 mm lengths. A shorter version in 12 mm length is now available for use on patients with small AP vertebral body dimensions. They also reduce artefacts on intraoperative radiographic imaging.



Fig 1



Fig 2



Fig 3



Fig 4

MIS: table mount and light guides

Surgeons treat many lumbar degenerative diseases, such as degenerative disc disease, with spinal fusion. Pedicle screws, rod fixation, and interbody spacer devices provide immobilization and stabilization of the spine during fusion. Traditionally, these implants are placed through large posterior mid-line incisions that require extensive muscle dissection and disruption of the posterior elements. In recent years, minimally invasive techniques for posterior approaches to the spine have sought to minimize tissue trauma, resulting in decreased operative site morbidity and pain, less blood loss and shorter hospital stay.

The MIS support system offers a comprehensive auxiliary instrument set containing everything necessary for secure table mounting and operative site illumination for use with all Retractor systems.

Fig 1
Table mount with light guides.

Fig 2
3-blade retractor with light mat.

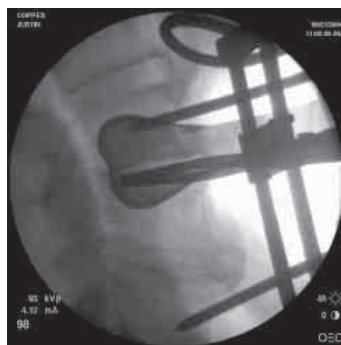
Fig 3
Point 2 Point (P2P) with light mat—top view.

Fig 4
Point 2 Point (P2P) with light mat—side view.

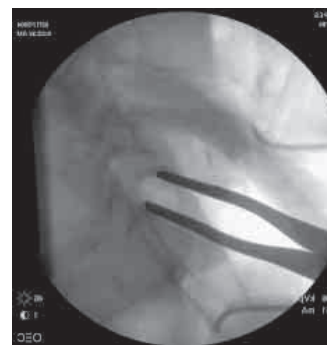
SynFrame/ProAccess Radiolucent Retractor Blades

With the introduction of the SynFrame Standard Access and Retractor System, anterior mini-open procedures and less-invasive spine surgery became attainable for many surgeons. The SynFrame Standard Access and Retractor System enables small incisions and significantly reduces tissue damage and blood loss. In anterior lumbar procedures, both fusion and disc arthroplasty, improved intraoperative fluoroscopic visibility is needed. In disc arthroplasty good visualization is especially important.

The radiolucent retractor blades offer surgeons a wider range of options for patients with excessive soft tissue and varying patient anatomy and provides improved fluoroscopic visualization. They are available in 80–200 mm lengths in the standard 25 mm width and wide 50 mm width. The black surface coating also helps to reduce glare from the instruments during surgery.



Fluoroscopic image with traditional retractors

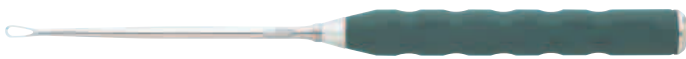


SynFrame and radiolucent retractor blades

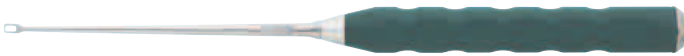


ProPrep lumbar disc preparation instrument set

The remobilization of the disc space is considered a critical portion of an arthroplasty procedure. The term remobilization refers to performing a complete discectomy and release of the posterior disc space. This step differs from traditional fusion discectomies, which typically only remove enough disc material to allow insertion of an interbody fusion device. Adequate remobilization is critical to the long-term function and mobility of a disc arthroplasty implant.



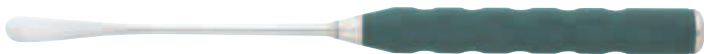
**Bone curette, angled, 3.5 × 4.5 mm,
5.5 × 8.5 mm, or 7.5 × 11.5 mm**



Bone curette, teardrop, 8 mm



Endplate elevator, 20 mm



Bone elevator, 17 mm



Probe, 90°, length 265 mm, ball tip



Blunt dissector, length 265 mm

The new ProPrep lumbar disc preparation instrument set consists of a comprehensive set of instruments which facilitate a complete discectomy for anterior fusion and nonfusion procedures. It addresses collapsed segments with reduced profile instruments and allows access to P/L corners with angled instruments. Furthermore, it provides optimized length for anterior approach and large body masses, and features incorporated “two-hand-grip” silicone handles for maximum instrument control.



**Disc rongeur, upbiting 3 × 330 mm,
4 × 330 mm, or 6 × 330 mm**



Disc rongeur, double acting, 8 mm



**Laminectomy punch, 40 degree, 330 mm
length, in 2 mm, 4 mm or, 6 mm**



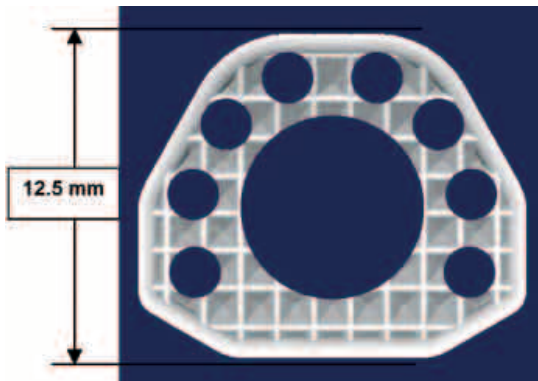
Bone Marrow Aspiration System (BMAS)

The BMAS provides an instrument for the percutaneous aspiration of bone marrow. It can be applied with synthetic bone graft substitutes for cancellous bone such as chronOS Inject which is osteoconductive and bioresorbable. ChronOS Inject is made out of 100% synthetic β -TCP. The biopsy needle is double sterile packed and available in 10 cm and 15 cm.



SynCage-C: small stature

The SynCage-C is a titanium cage system designed for use in interbody fusion procedures from C2/3 through C7/T1. The new SynCage-C small stature has the same design as the existing SynCage-C but is smaller, to provide more options for different anatomies. Subsidence tests have shown that the SynCage-C small stature is as safe as the standard SynCage-C. A smaller implant holder and the respective trail implants for the SynCage-C small stature are available.



Lim Cheung, Ralf Gutwald, Larry Hollier

NEW CRANIOMAXILLOFACIAL PRODUCTS



1.5/2.0 mm cruciform screwdriver blade, medium, self-retaining, hex coupling

Medium length cruciform screwdriver blade

The cruciform screwdriver blade is an addition to the current series of hex coupling screwdriver handles. It is intended for use in craniomaxillofacial applications that require a longer blade than the existing short version, but that the long version is too long. This medium length version has been developed due to popular request, and is offered with 1.5/2.0 mm cruciform blade with hex coupling end.



1.5 mm rapid resorbable tack, 6 mm

Rapid resorbable tack and 1.7 mm emergency rapid resorbable tack

The resorbable tack system was developed to provide surgeons with a means for fast and simple fixation of resorbable plates to the bone. The resorbable tacks feature circumferential ribs which provide interference fit against bone when tacks are press-inserted into predrilled holes. The simple drill and push insertion is a time saving means of plate fixation. This tack line extension is manufactured from 85:15 poly (L-lactide-co-glycolide) as are all other implants in the rapid resorbable fixation system. It is available as 1.5 mm regular plus 1.7 mm emergency version, and compliments the screw options currently available. The existing instrumentation is utilized.



2.0 mm cruciform screwdriver blade, self-retaining, mini quick coupling

Self-retaining cruciform screwdriver blade for Resorbable Fixation System (RFS)

This Cruciform Screwdriver Blade is designed to pick up, retain and insert screws from the Rapid Resorbable Fixation System. Its self-retaining ability makes it more user-friendly than the currently existing versions with holding sleeve. It also allows for better visualization of the surgical site. The self-retaining cruciform screwdriver blade is offered in 1.5 mm and 2.0 mm versions with hex or mini quick coupling.



External midface distractor system

The external midface distractor is a distraction osteogenesis device that attaches to the cranium and midface and is used to gradually lengthen the midface at the Le Fort I, II, and III levels (including monobloc). It addresses the clinical need for an external distraction device to treat patients with congenital craniofacial anomalies with severe midface retrusion, which can lead to airway obstruction and nutrition difficulties. It meets requests for an external device to achieve controlled advancement of the midface where internal devices are not desirable. Therefore, it is particularly well suited for younger patients who are not skeletally mature and have mixed dentition. It can be placed and removed more easily than its internal counterpart and allows for post-operative vector control of the bone segments.

Some of the most common syndromes that are treated with the external midface distractor are Pfeiffer syndrome, Apert syndrome, and Crouzon syndrome. It can also be used on patients with cleft lip and palate as a secondary procedure in their teenage years to address their anterior maxillary growth deficiency.

Device description

The external midface distractor consists of an external head frame, a vertical carbon fiber rod assembly, horizontal crosspieces containing distraction screws, and separate internal footplate assemblies that attach to the zygoma and maxilla. The external components are connected to the internal hardware with wires. Scalp fixation pins are used to attach the device to the lateral aspects of the cranium.

The device is assembled prior to placement on the patient. The head frame, vertical carbon fiber rod assembly, and horizontal crosspiece with distraction screws are joined together and secured by set screws. For Le Fort I and II advancement one horizontal crosspiece is joined to the vertical carbon fiber rod assembly primarily at the level of the maxilla. For Le Fort III and monobloc advancement two horizontal crosspieces are joined to the vertical rod assembly; one primarily at the level of the zygoma or infraorbital rim and one primarily at the level of the maxilla.

The head frame can be adjusted to fit a range of patient head sizes. The head frame expands laterally as a unit using a central adjustment screw located in its hub. Rear adjustment screws located in the mounting plates of the head frame adjust the anterior projection of the device. The vertical carbon fiber rod can be adjusted laterally for placement along the patient's midline, independent of the head frame position on the skull. The vertical carbon fiber rod can also be rotated both anteriorly/posteriorly and right/left to minimize obstruction of the patient's path of vision and enable the patients to have an unobstructed access to deliver food to the mouth.

Mounting pins in rounded, conical, and self-drilling versions are used to secure the device to the patient. Rounded pins do not pierce the soft tissue and are used for initial stabilization of the device on the cranium. Conical pins pierce the soft tissue to apply clamping pressure to the lateral skull bones for securing the device. Self-drilling pins are offered as an alternative to conical pins to engage and secure the headframe to the bone by threading into the bone in the same manner similar to standard cranial bone screws.

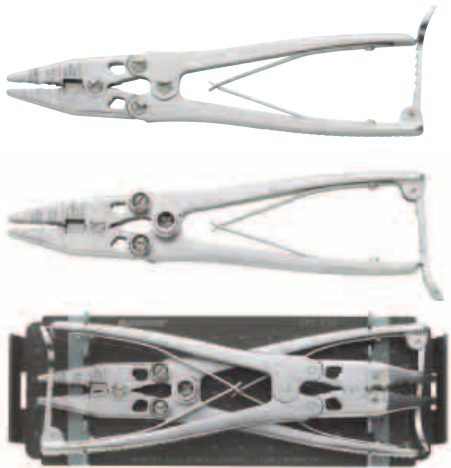
Active distraction is accomplished by the patient using a screwdriver that mates with a hex nut on each distraction screw assembly. The midface can be advanced in 0.5 mm increments by the patient. According to the surgeon's instruction. Further refinements of the position of the midface are accomplished by the surgeon using the adjustment capabilities of the device. This is achieved by loosening the wires connecting the external device to the internal hardware, repositioning the horizontal cross pieces, and retightening the wires.

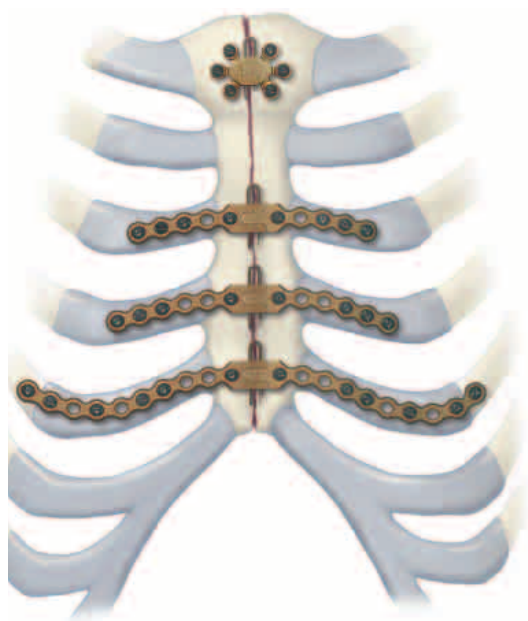
Removal of the device is accomplished by cutting the wires between the internal and external hardware, removing the mounting pins from the cranium, and removing the internal hardware. Depending on the type of internal hardware used, a second general anesthesia may or may not be needed for device removal.

Combination bending pliers and bending pliers for 2.0 and 2.4 plates (locking and nonlocking), bending iron and shortcut plate cutter for 2.4 plates and the plate/rod cutter

Currently over seven instruments are available to either cut or bend plates. Hence they have to be combined with instruments that perform the other function. This adds to the size and complexity of instrument sets. The mandible plate bender/Cutter set is intended to offer the functionality of benders and cutters in one instrument set. The instruments are offered in one compact, organized insert tray, and allow for performance of the following functions:

- Bending of 2.0 and 2.4 mandible plates in-plane, out-of-plane, and in torsion.
- Bending of the last segment of a plate.
- Cutting of mandible plates with the integral cutter.
- Burr removal from cut plates.





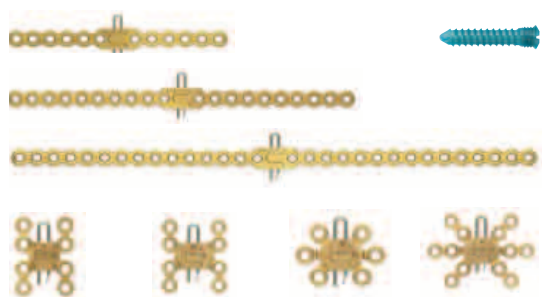
Ti sternal fixation system

A small percentage of surgical procedures that involve splitting the sternum to enter the thoracic cavity develop serious complications that require sternal repair and/or reconstruction.

The new sternal fixation system is intended as a solution to encourage bony union in these cases. It serves as a solution for surgeons looking to rigidly fixate these patients with the added safety of emergent re-entry.

While many surgeons currently remove the sternum, the new system allows for a procedure that involves reducing the sternal halves and implanting plates, which span the sternum and are fixed to the ribs and/or sternum of the patient. The chest wall is then reinforced through advancement of the pectoral muscles.

The sternal fixation system consists of titanium locking plates that function with 3.0 mm titanium locking screws, similar to those used in the mandible area. The straight plates are actually an assembly of two single plates, which are connected by a U-shaped pin. In case of emergency removing the pin allows re-entry into the thoracic cavity. Long and straight plates are fixed to the ribs; additional smaller plates are available for fixation of the manubrium.



Implants

The sternal fixation system is available with 12 holes titanium locking plates as well as titanium locking “H” plates small/large and titanium locking “Star” plates with 6 and 12 holes. The set contains locking screws (3.0 mm) from 8 mm to 18 mm and the titanium Emergency Release Pin to connect and disconnect the plates at the fixation site. A titanium sternal locking plate with 30 holes is available additionally.

Instruments

The sternal fixation system set contains a 2.4/3.0 mm screwdriver with holding sleeve, a combination bending pliers for 2.0/2.4 plates, a bending template with 37 holes as well as a plate cutter. For effective reduction of the sternotomy there are special sternal reduction forceps and additional large bone reduction forceps available.

The set also comes with respective threaded drill guides and drill bits with stops from 8 mm to 18 mm (J-Latch).



Mathias Müller

NEWS FROM AO CLINICAL INVESTIGATION & DOCUMENTATION (AOCID)

ETNS handling test

Please see product description on pages 8–9.

Intramedullary nailing today is still the method of choice in the treatment of tibial shaft fractures. Various nailing systems from different manufactures generally differ only in the details of their features that are on offer to the surgeon. For many years the AO has been advocating the application of the various designs of UTN. As the published literature of the last few decades shows, the UTN reliably stabilizes diaphyseal fractures of the tibia, however, in the meantime more innovative and user-friendly products have been introduced to the market.

Currently, a main goal of the modification and development of new nailing systems is, partly for commercial reasons, to make available a safe, modular system with which shaft fractures of the tibia, femur and humerus can be treated. This should include the possibility to utilize the same standard set, possibly with additional instruments, to implant the various types of nails. Obviously it is a basic condition that this system fulfils the technical and clinical requirements of intramedullary nailing osteosynthesis.

The recently developed Expert Tibial Nail System (ETNS) is, so to speak, the first module in a new product range from Synthes Inc. for the treatment of fractures of the long bones. The various innovative locking options, whereby the most proximally positioned screw can be locked at a fixed angle by insertion of an end cap, have broadened the range of indications both proximally and distally in comparison with the UTN.

Modifications have been made to the nail design based on results from the first handling test indicating that difficulties were still arising. The second ETNS handling test started in August 2004. Ten trauma centers in six different countries (D, A, CH, GB, NL, SF) participated in this prospective handling test.

Administrative planning and data collection was handled centrally by AO Clinical Investigation and Documentation (AOCID) in close collaboration with Synthes Inc. After a short preparatory period, 190 patients (118 male, 72 female) were successfully recruited to the handling test within a period of 11 months. The female patients were on average 9 years older than the male patients (average age 40.7 (male): 49.7 (female) years). There are age peaks between 20 and 30 years of age and 40 and 50 years of age.

The 12 week follow-up was performed for 154 patients (81% follow-up rate). The follow-up evaluation took place on average 91 days after the operation. In only three cases was a secondary dislocation of the fragments described at this time. These three patients all showed delayed fracture healing after complex diaphyseal fracture. In 88% (n = 136) of the cases available to follow-up, fracture healing is described as “ongoing”. “Delayed union” was observed in 18 patients. Nine of these patients had presented initially with an open fracture. One case of delayed healing was observed in a 54-year-old woman who had sustained bilateral fractures and posttraumatic paraplegia. In another case, delayed healing occurred in conjunction with wound infection. In the majority of these cases, the treating surgeon chose to wait before intervening. Dynamization of the nail was only performed in three cases.

On the basis of the data available so far the AO TK has been able to award this implant its approval as a “standard AO implant”.

Definitive evaluation is expected to take place after completion of the 1-year follow-up assessments in spring 2006. This will provide us with the final results with regard to fracture healing, reduction, axial alignment, any complications, necessary revision operations, and an evaluation of the handling of the ETNS. It is planned to summarize the results in a publication.

Contact: mathias.mueller@aofoundation.org

ETNS Case

60-year-old man with a type II open 42-A2 fracture following a working accident.



Fig 1
Preoperative x-rays.



Fig 2
**After reaming up to 10 mm easy insertion of the nail.
Postoperative x-rays.**



Fig 3
The 12-week follow-up showed ongoing fracture healing and normal axial alignment.

Volker Quarz

NEWS FROM THE AO DEVELOPMENT INSTITUTE (ADI)

The pelvic emergency training device

Unstable pelvic fractures (Figure 1) with shock-induced hemorrhaging only account for a small percentage of pelvic injuries, but represent a life-threatening emergency for the patient. It is crucial for the patient that the treating physician recognizes the mechanically and, in some cases, hemodynamically unstable situation and has a good command of the emergency treatment techniques [1–3]. Adequate theoretical and practical training of doctors performing emergency treatment is essential [4].

The ADI has developed a pelvic emergency trainer device with which an unstable injury to the posterior pelvic ring with severe venous hemorrhage into the lesser pelvis can be realistically simulated (Figures 1–2). The emergency training device is closely associated with the development and application of the pelvic C-clamp. Please see product description on pages 2–5.

The emergency training device (pelvic emergency trainer) is intended for courses, emergency training sessions, and assessment of learning achievements. Life-saving procedures, compression with the pelvic clamp, and tamponade of the lesser pelvis can be performed under the realistically stressful conditions of the emergency room. In addition, an unstable fracture adjacent to the knee joint has to be stabilized with an external fixator (Figures 3–6). If the clamp is incorrectly positioned or the tamponade ineffective, bleeding persists and is immediately visible to the surgeon in the form of a blood-red liquid which continues to flow (Figure 4). This exercise, performed under very realistic conditions, provides even experienced surgeons with valuable feedback. The exercise with the pelvic emergency trainer has already been integrated on several occasions into the pelvic management courses in Homburg/Saar, Germany as a central element of the final assessment. The amount of positive feedback received is an indication that the pelvic dummy designed by the ADI in collaboration with AOI will also be a valued contribution to the curriculum at AO pelvic courses in the future.

The ADI has modified the pelvic emergency trainer and created a smaller version for the purpose of Synthes product training sessions (Figure 7). The “small” pelvic dummy has been transferred to Synbone and is being manufactured as a standard product. Synthes uses the “small” version for additional product training in the handling of the new emergency pelvic C-clamp (refer to article on page 2) in order to improve user confidence with this instrument. Compression of the anterior and posterior pelvic ring is evaluated by circulation of air after reduction and application of the pelvic clamp.

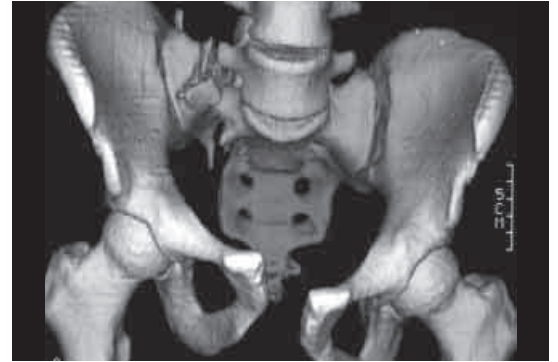


Fig 1
Basic type C pelvic ring fracture

- 1 **Bosch U, Pohlemann T, Tscherne H** (1992) [Primary management of pelvic injuries]. *Orthopäde*; 21(6):385–392.
- 2 **Pohlemann T, Culemann U, Tosounidis G, et al** (2004) [Application of the pelvic C-clamp.]. *Unfallchirurg*; 107(12):1185–1191.
- 3 **Seekamp A, Burkhardt M, Pohlemann T** (2004) [Shock trauma room management of pelvic injuries. A systematic review of the literature]. *Unfallchirurg*; 107(10):903–910.
- 4 **Culemann U** (2003) Lebensbedrohliche Verletzungen des Beckens - Ist die Technik erlernbar? Erfahrungen mit der Simulation. Vortrag A25.6, 67. Jahrestagung Deutsche Gesellschaft für Unfallchirurgie, Berlin.

Contact: volker.quarz@aofoundation.org



Fig 2
The “patient” is prepared in the emergency room.



Fig 3
Stab incision to insert the pins.

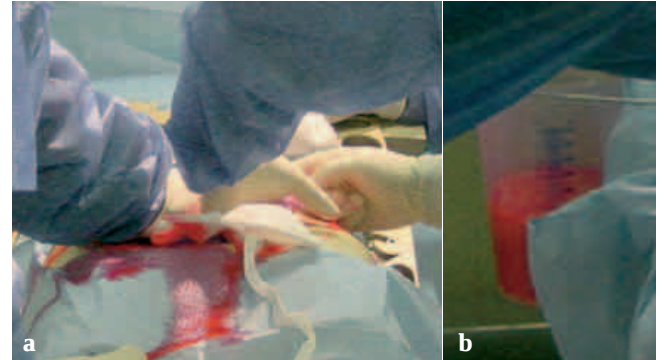


Fig 4
a Laparotomy in the pubic region with tamponade after reduction and complete application of the pelvic clamp. A retroperitoneal hematoma is simulated.
b The patient’s “loss of blood” is visible to the surgeon throughout the entire procedure (see also the reservoir with red fluid in Fig 2).



Fig 5
An external fixator is simultaneously applied by another team.

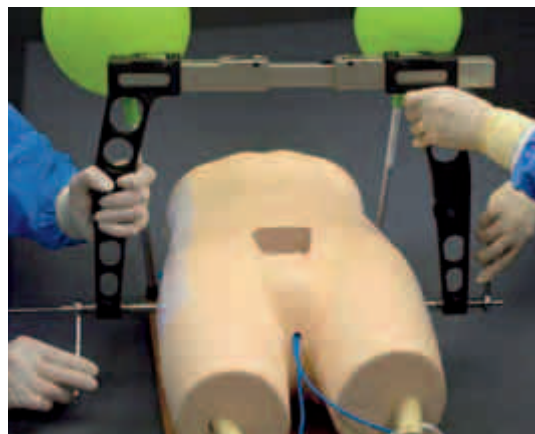


Fig 6
End of the exercise; the pelvic clamp is in place.

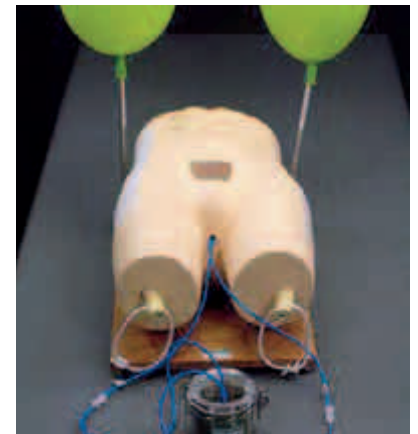


Fig 7
A small pelvic dummy is available as part of an introduction to the new emergency pelvic clamp.

Berton A Rahn, Christof Müller, Jim Green

NEWS FROM THE AO RESEARCH INSTITUTE (ARI)

In vivo assessment of the Reamer-Irrigator-Aspirator (RIA). *)

RIA vs unreamed nailing

The purpose of this part of the study was to compare the effects of reamed intramedullary (IM) nailing using a new reaming system which uses irrigation and suction (RIA: Reamer-Irrigator-Aspirator; Synthes USA) with unreamed IM nailing; the goal being reduction of fat emboli in the blood, and coincidentally preventing occlusion of intracortical vessels. Sheep were treated with reamed (RIA) and unreamed (UR) intramedullary nailing on both unfractured femora. Blood samples were taken from both femoral veins during consecutive steps of IM nailing: UR: nail insertion; RIA: guide wire insertion, reaming, and nail insertion. They were assessed for fat content using a modified Gurd Test. Number and size of fat droplets was measured and data expressed as differences between nail insertion on the UR side and each step on the RIA side. In histological cross-sections intra-vital staining and fat staining, indicating functioning cortical perfusion and distribution of fat in cortical vessels, was evaluated. Ratios of perfused and fat containing vessels out of the total number of cortical vessels were then calculated. Fracture healing was studied in the tibia. The procedure was first performed in the left tibia, with an observation period of ten weeks. Bone

remodeling was labeled with Calcein green, Xylenol orange and Tetracycline. Pre-terminally the same nailing procedures were performed in the right tibia, followed by intravital staining with Procion red, and an ink perfusion of the left tibia. The fractured left tibia was embedded in polymethylmethacrylate and histological sections and contact radiographs were evaluated with respect to callus development, cortical remodeling and ink perfusion. In the right tibia acute effects on cortical perfusion (Procion red staining) were evaluated in polymer embedded sections. Cryocuts were evaluated with respect to fat distribution (Sudan III staining).

Blood samples from the RIA side contained significantly less fat than the samples from the UR side. After irrigation and suction little fat was observed in the cortex of RIA specimens, whereas after unreamed nailing the endosteal third of the cortical bone was infused with fat. Unreamed nailing acutely showed signs of remaining perfusion in the endosteal tenth and periosteal third of the cortical bone, after irrigation and suction-reaming perfusion was preserved to a lesser degree due to ablation. After ten weeks callus development and perfusion was similar in both groups. Cortical remodelling was the same in both groups after four weeks and was three times larger in the unreamed group after six weeks, indicating a more pronounced reaction to intracortical damage.

Irrigation and suction significantly reduces fat intravasation, and thus the danger of adverse systemic effects, while fracture healing is comparable to unreamed nailing.

Please see product description on page 11.

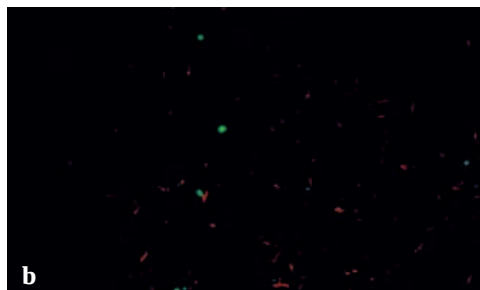
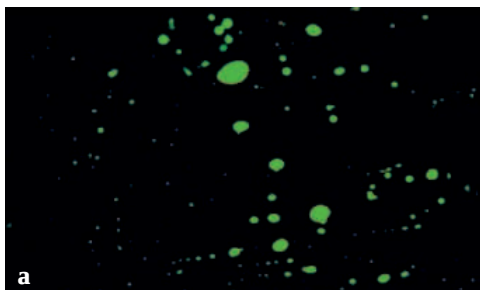


Fig 1

- a High amount of fat droplets in blood harvested from the femoral vein 15 seconds after unreamed nailing.**
- b Minimal amount of fat droplets in venous blood after RIA reamed nailing.**

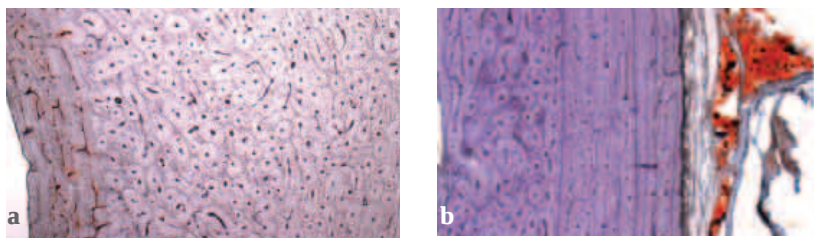


Fig 2

- a** Typical specimen of unreamed nailing with a red seam of stained medullary fat on the endosteal side of the cortex (left).
- b** Typical specimen of RIA nailing with no medullary fat visible in the cortex. The correct functioning of the staining technique is illustrated in the attached soft tissues on the right.

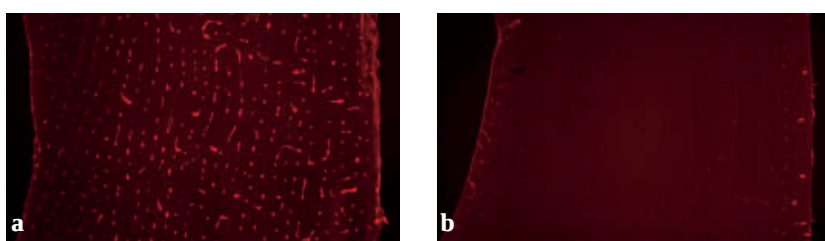


Fig 3

Perfusion did not show dramatic differences between the two nailing techniques, and disturbances covered a wide range.

- a** Example for a cortical region with relatively good blood supply.
- b** Example for an almost nonperfused cortical region.

RIA as a bone harvesting device

The RIA system permits the collection of bone particles which are produced by the reaming process. This system was used to study the influence of such bone particles, and of platelet rich plasma (PRP) on fracture healing. The results were compared to those of the SynReam (SYN) system.

In sheep, a defect of 8 mm was created in the left tibia at the midshaft. The RIA system was used in the groups RIA (no defect filling), RIA+B (bone particles) and RIA+B+PRP (bone particles+PRP), and the SynReam system in group SYN. The medullary cavity was reamed to 11 mm in all four groups prior to implantation of an UHN (9.5 mm x 190 mm). After 6 weeks both tibia were harvested. Evaluation included mechanical testing, quantitative radiological evaluation and histomorphological analysis of newly formed bone.

For stiffness and strength the highest values were found in the group RIA+B, and they differed significantly ($p < 0.05$) from group RIA. The values of RIA+B+PRP and RIA+B were significantly higher ($p < 0.01$) than the values of SYN. After 4 weeks the radiological evaluation of callus area showed significant differences ($p < 0.05$) between the two groups RIA+B+PRP and RIA+B and the two groups without bone reimplantation (RIA, SYN) but this difference was no longer visible at a later stage. No difference between RIA and SYN was found.

Callus formation can be significantly stimulated by the reimplantation of bone particles which are produced and collected by the RIA system. A clinical use of such techniques therefore seems to have an interesting potential.

*) This contribution is a summary of the following doctoral theses which were performed in collaboration with Synthes USA and the Albert-Ludwigs-University Freiburg:

Hagen R (2001) An in-vivo comparison between reamed intramedullary nailing with the novel Reamer Irrigator Aspirator (RIA) and unreamed intramedullary nailing. Thesis, University of Bern, 2001.

Klein C (2002) Der Einfluss von Spülen und Absaugen auf die biologische Reaktion nach Markraumböhrung, Thesis, University of Freiburg.

Hammer T (2004) Der Einfluss des Bohrmehls auf die Frakturheilung. Eine vergleichende Untersuchung der drucklosen Markraumböhrung mit dem 'Reamer-Irrigator-Aspirator' (RIA) und dem Synream System. Thesis, University of Freiburg, 2004.

Bonetta M (2005) Einfluss des Bohrmehls auf die Kallusbildung bei Tibiadeфекten. Eine histomorphologische Untersuchung an der Schafstibia. Thesis, University of Freiburg.

Nicola Rusca

VIDEO GOES DVD

AO Faculty members may choose from as many as 5,000 videos and many make keen use of this superior training tool. The future-oriented strategy developed by Video and Multimedia at AO International, not only fulfills increased didactic requirements, but also allows for technology developments and meets user needs.

The new strategy will bring improvements in the following core areas:

Work flow

Quality control of AO Teaching Videos (exercises) falls within the responsibilities of the AO Technical Commission (TK) and the Expert Groups (EG). Calling in other experts as needed, these two panels also determine which product or surgical intervention requires a teaching material (including video) for a visual training aid. The novelty in this area is the parallel of video production and product development, involving very close cooperation between the two. As a result, the manufacturing period of the video is shortened, the approval process is simplified, and the contents are always up to date.

Digital video technology

At this time all videos are available on VHS and as MPEG 1 files on CD-ROM. However, as our video studio is being fully digitized, the strategic orientation clearly focuses on DVD with the Web being used for previews and orders. Eventually, all videos will be available on DVD.



Didactics

In addition to improved visual quality, DVD technology offers benefits such as improved navigation, clarified structure and a unified visual language. Each video is designed based on the same principle. Its structure is modular with chapters and subchapters that may be selected directly. This way users will see at a glance what the DVD has to offer, which will enable them to compose the order of information units according to their interests.

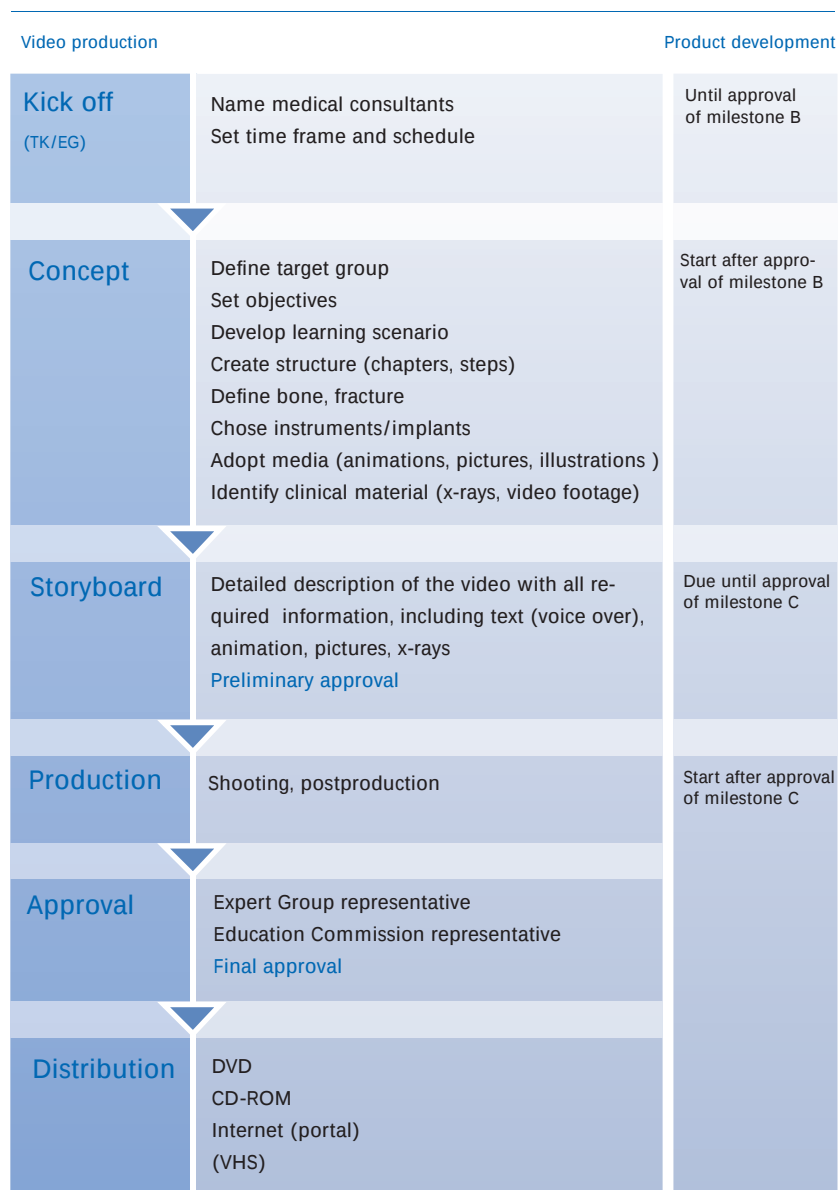
AO videos on the Web



All available AO Teaching Videos are listed on our website and may also be ordered by email (video@aofoundation.org). Easy-to-use search functions help you to find the video you are looking for:

Go to www.aofoundation.org.

Select "Video" on the right hand side, log in using your username and password, and simply browse the catalog.



From “Kick off” to “Distribution”: the AO videoproduction follows a set of step-by-step procedures.



DVD start-up screen: the disc is clearly structured with options for workshop and clinical reality.

Clinical links

Switching to DVD also creates the possibility of “clinical links”, ie, “live” footage of real surgical interventions. The DVD’s main menu will show which workshop subject is complemented by a clinical video, and such video may be run by simply selecting it in the menu. Combined clinical videos and animations now make the training information even easier to absorb.

Collections

Furthermore, DVD permits the production of “collections” that hold several videos on the same subject. The first such collection consists of the AO Principles Course including all videos and abstracts on two DVDs. Next, we will issue a collection on the application of the “External Fixator” and all maxillofacial videos.

Feedback

If you have comments or questions regarding AO Teaching Videos please contact: nicola.rusca@aofoundation.org.

Steven Ludwig

PORTRAIT OF DANIEL E GELB, MD



Daniel Gelb is an accomplished orthopedic spine surgeon. He has been involved with AOSpine of North America since 1998. Dr Gelb attended Dartmouth College where he received his undergraduate degree in Government and graduated Summa Cum Laude. He continued his education at the New York University School of Medicine, where he graduated with highest honors as a member of the Alpha Omega Alpha Medical Honor Society. It was in medical school that his interests in Orthopedic Surgery emerged. He went on to complete his orthopedic training at Strong Memorial Hospital in Rochester, New York. Influenced by Dr Donald Chen, Dr Gelb pursued his interest in spine surgery. Dr Gelb went on to complete his spine fellowship at Washington University School of Medicine in St. Louis, Missouri. It was there that his focus on deformity spine surgery emerged under the tutelage of Drs Bridwell and Lenke. Dr Gelb further advanced his training in scoliosis surgery at the Yves Cotrel Fellowship in Paris, France.

Following his exceptional and comprehensive training, Dr Gelb returned to the United States, where he began his career as an Assistant Professor of Orthopedics at the Milton S Hershey Medical Center. While spending eight years in Pennsylvania, Dr Gelb's innate ability to simplify and explain complex concepts and processes enabled him to serve as an exceptional mentor and educator of residents and medical students alike. This talent was formally recognized in 2000 when he received the Resident Teaching Award. In addition, his natural surgical ability and excellence in patient care established a precedent of outstanding spinal care. In 2002, Dr Gelb left Pennsylvania to become an

Associate Professor and Vice Chairman in the Department of Orthopedics at the University of Maryland School of Medicine. Through integration of his previous clinical and educational experiences, Dr Gelb has been instrumental in building a well respected academic orthopedic program. Dr Gelb's clinic practice encompasses an array of spinal interests: His expertise lies in the realms of spine trauma, adult spinal deformity, and tumors of the spine. His work at the R Adams Cowley Shock Trauma Medical Center, has brought an advanced level of care to patients with traumatic spinal injuries. In addition to maintaining a high volume clinical practice, Dr Gelb conducts clinical and biomechanical research, edits musculoskeletal textbooks and journals and is active in NASS, SRS, the AAOS and the OTA.

In 1998, Daniel Gelb became a faculty member of AOSpine. Dr Gelb quickly became known in the AOSpine community as a distinguished spine educator, utilizing his expertise to teach practicing surgeons his evidence based philosophy for treating patients with complex spinal disorders. Dr Gelb has been an integral part of the AOSpine organization, and during the academic year, he can be found at numerous AO course programs. He has emerged as a well respected leader in the AOSpine community and now sits as the Chairman of the Faculty Issues Committee.

Dr Gelb has been married to his wife Jillian for nineteen years. They have two children, Samara, fifteen, and Aiden, eight. In his spare time, he can be found running, skiing, and traveling.

Dr Gelb is committed to academic spine surgery and the pursuit of excellence in the AOSpine community. He is a figure of national repute and has fast become a top leader in the field of spine surgery.

CASE NEW PELVIC SET

The new pelvic set is described on page 2–4.

32-year-old man (165 kg), fell 7 meter into stairwell; bilateral open tibial fractures and both column fractures variant.

Preoperative x-ray and CT scans.



Postoperative x-rays.



Hazards

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