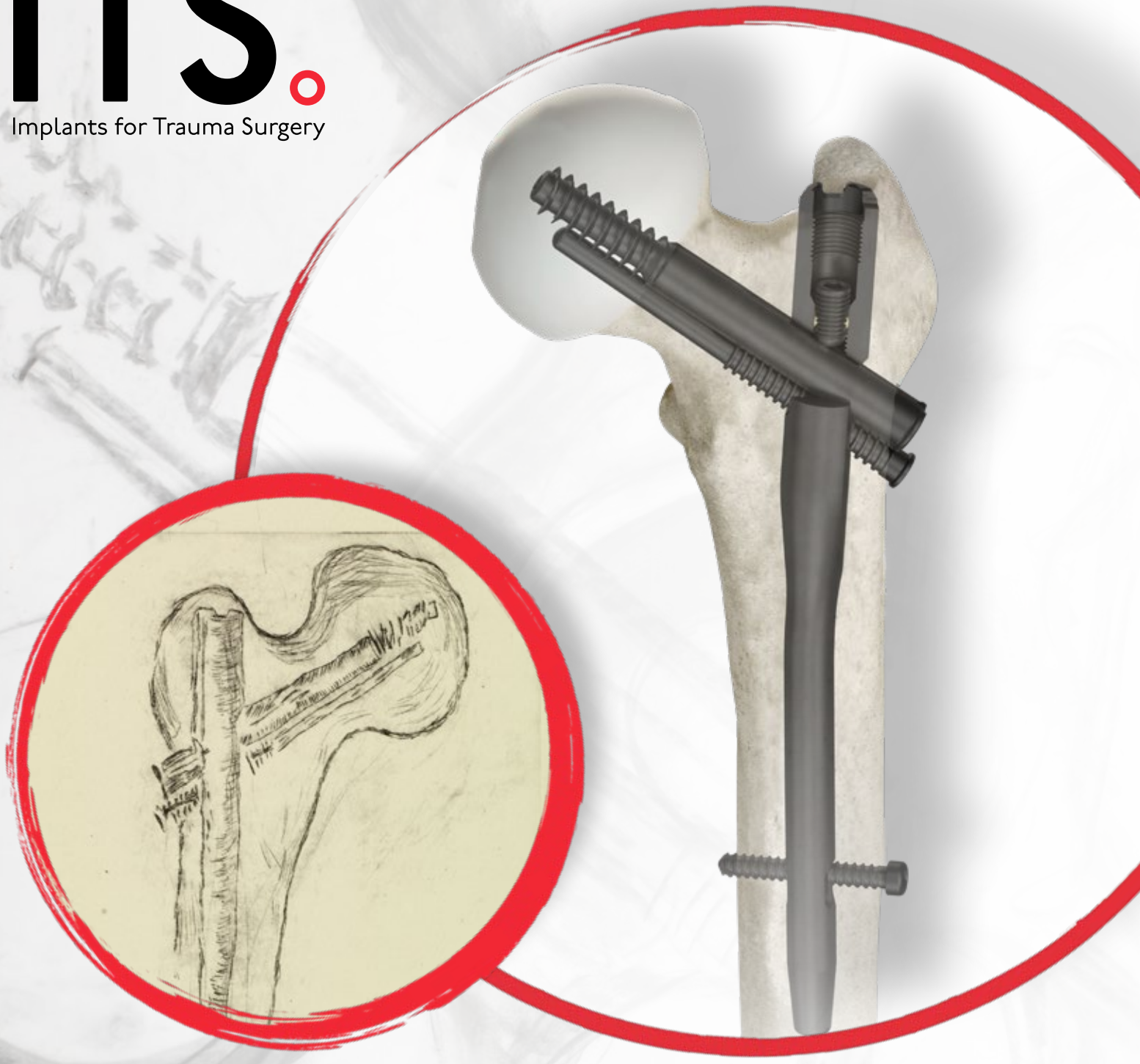
ITS.

Implants for Trauma Surgery

PROXIMAL FEMUR



G-SERIES

HIP-G

Made in Austria

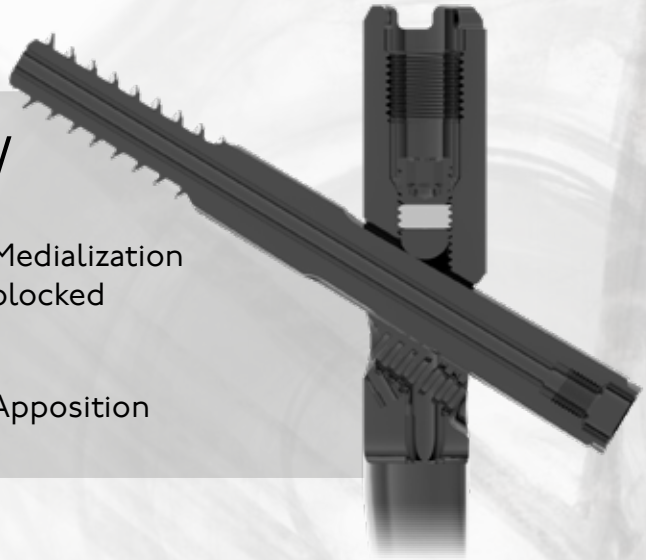
Proximal Features

- Easy-to-use, built-in targeting guides to aid K-wire placement
- 2 portal approach providing rotational stability both intra- and post-operatively
- Inferior DyCon® Set Screw allowing for controlled dynamization
- Built-in closing of the fracture gap and compression of the fracture

Set Screw Options

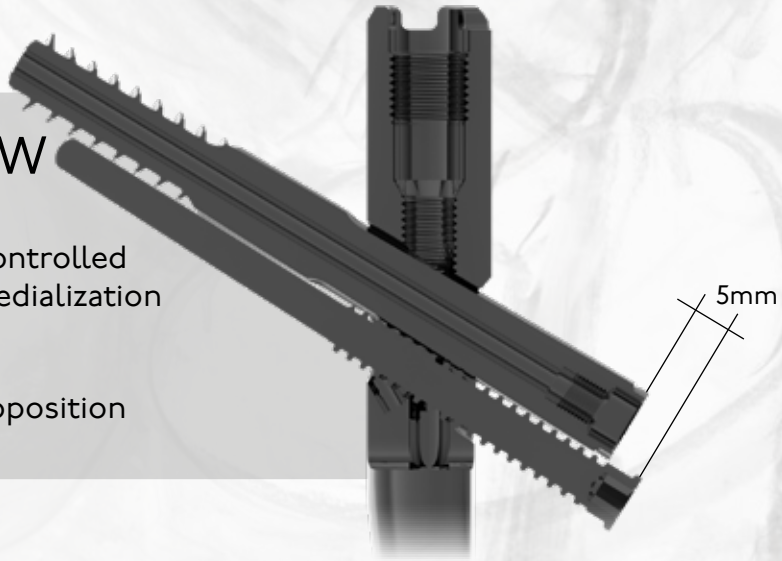
AXIAL SET SCREW

- Dynamization Control
- Medialization blocked
- Compression
- Apposition



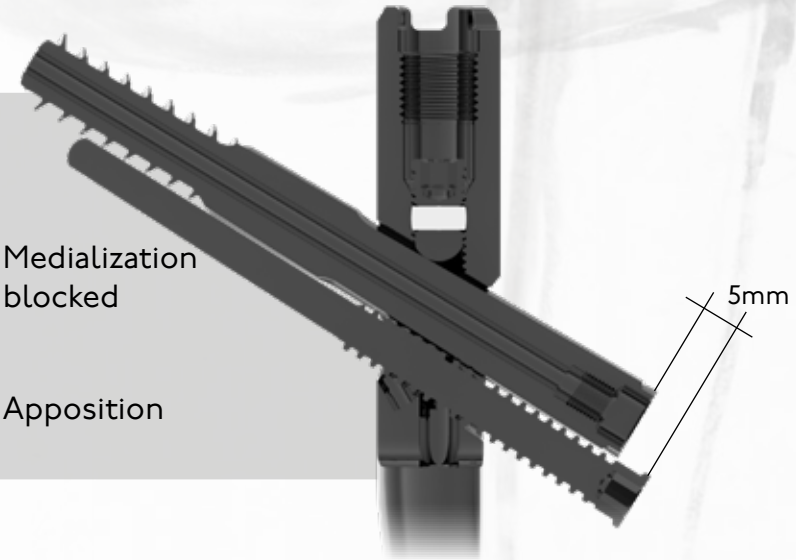
DYCON SET SCREW

- Dynamization Control
- Controlled medialization
- Compression
- Apposition



COMBINATION

- Dynamization Control
- Medialization blocked
- Compression
- Apposition

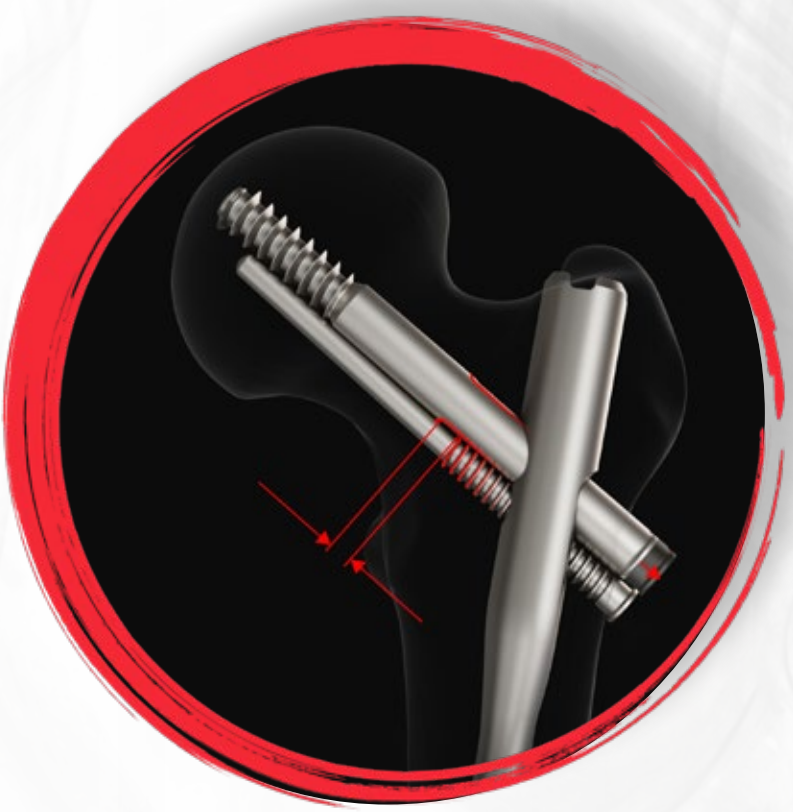


Axiale Set Screw

The Axial Set Screw can be used alone or in combination with the DyCon® Set Screw. If used alone, the medial movement of the Lag Screw is blocked and the lateral movement is free depending on the remaining groove length of the Lag Screw.

Dynamization Control

The DyCon® Screw pair, consisting of the load-bearing Lag Screw with the inferiorly placed DyCon® Set Screw, forms a dynamically controlled force carrier system in the femoral neck and head.



The Inferior DyCon® Set Screw anchors in the nail and runs at a slight angulation into a groove in the Lag Screw. This technology allows for controlled lateral dynamization of the Lag Screw, while inhibiting medial migration with the full contact area between the two screws.

STATIC

DYNAMIC +

The standard technique describes a recommended 5mm dynamization shown above. However, with this design, the movement of the Lag Screw can be controlled in a fully scalable manner, from 0mm (static) to 10mm dynamization (Dynamic +).

Apposition

Our system offers two effective methods for closing a fracture gap: the appositioning instrument or our new L-tool, both designed to ensure precise alignment and optimal fracture healing.

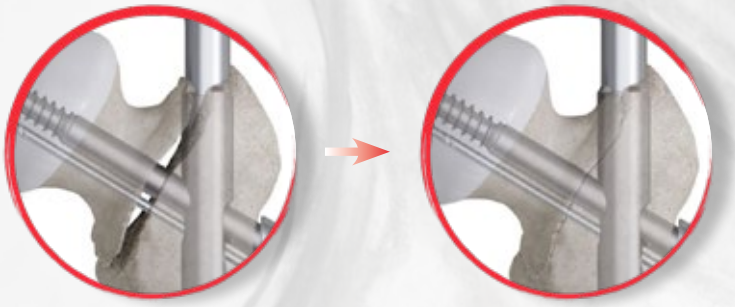
PF Appositioning Instrument

PF L-Tool

PF L-Tool Retention Rod

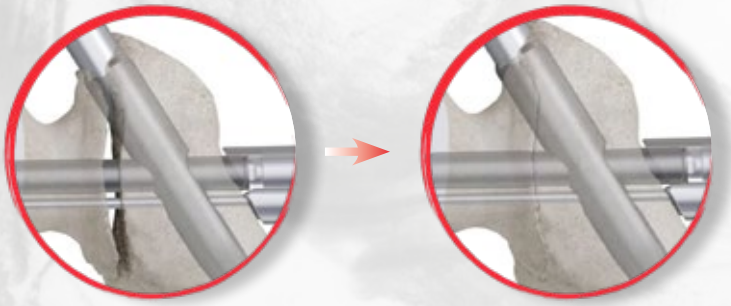
APPOSITIONING INSTRUMENT

The appositioning instrument allows a tensile force to be applied between the tissue-protecting sleeve and the screwdriver. By closing the handles, the jaws are spread apart, thereby closing and stabilizing the fracture gap.



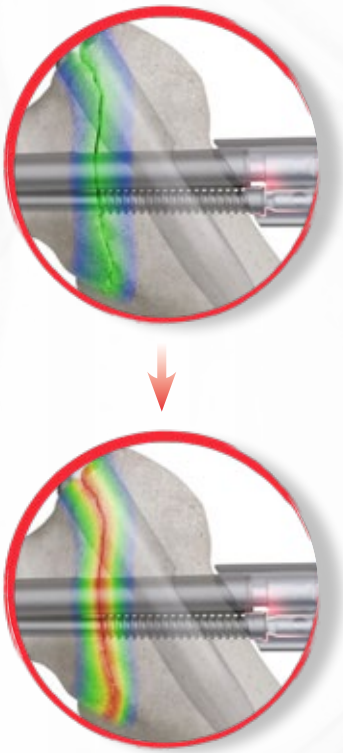
L-TOOL

Appositioning with the L-tool is achieved by turning the apposition screw. The screw presses against the tissue-protecting sleeve, and the lag screw is moved laterally, closing the fracture gap.



Advanced Compression

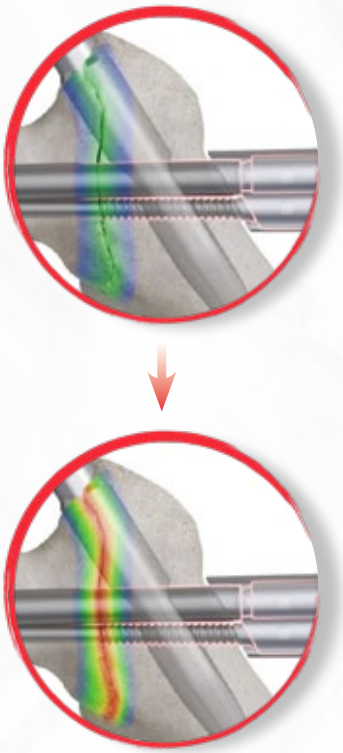
Analogous to apposition, the system offers two reliable options for advanced compression, ensuring both stable fragment contact and secure stabilization under load.



COMPRESSION ROD

PF Compression Rod

By turning out the DyCon® Set Screw, controlled compression across the fracture site can be achieved using the compression rod. This supports stable fracture healing and enhances primary stability.

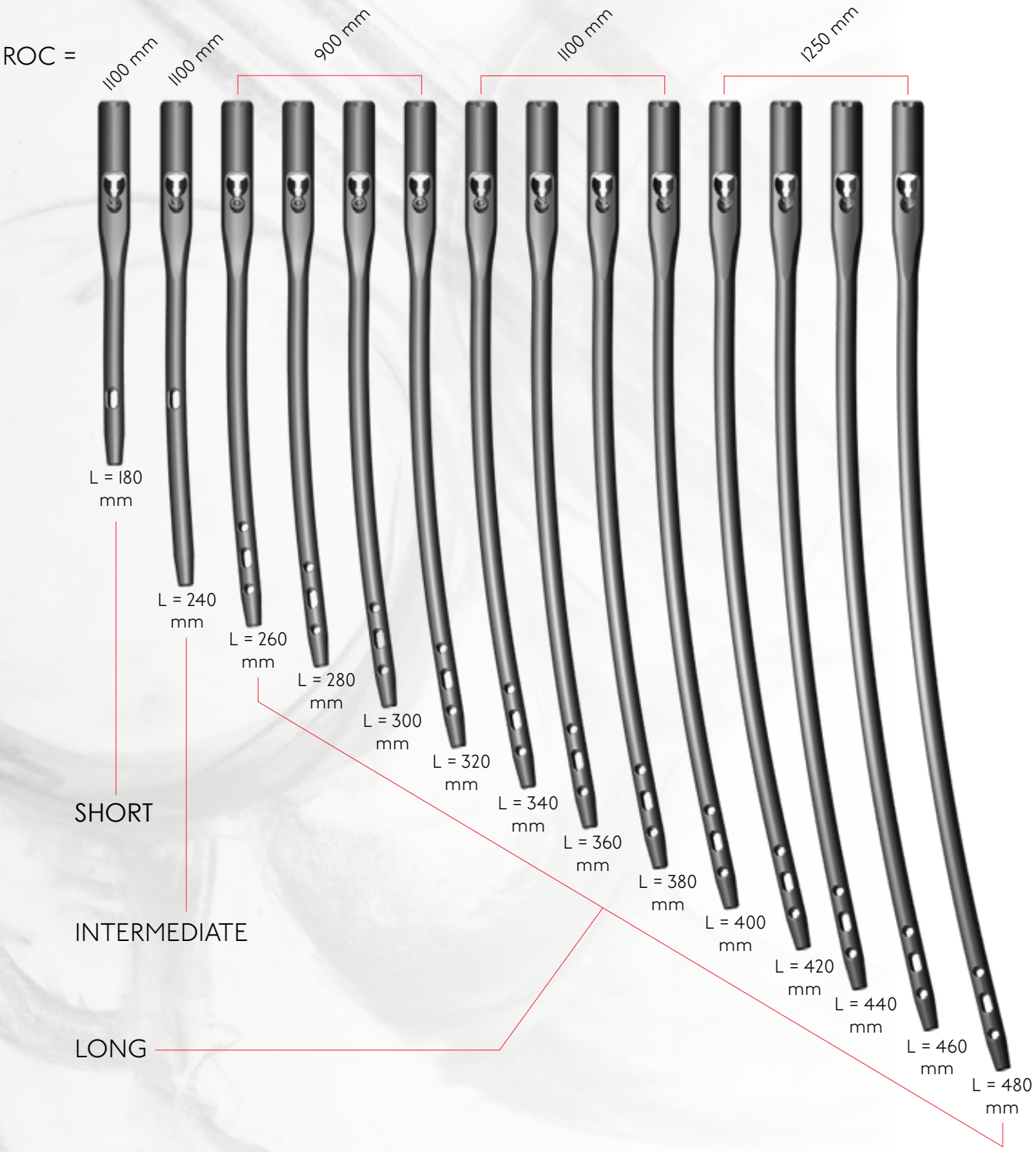


L-TOOL

Our new L-Tool enables targeted compression by engaging the slider on the screwdriver. Turning the screwdriver counterclockwise applies controlled compression across the fracture site, ensuring precise and secure fixation.

Nails

All nails come in left and right versions, with length-dependent antecurvatures to allow for a close anatomical fit to the patient. The short and intermediate nails are indicated for all lengths of femur and as such use the average femoral antecurvature of 1100 mm.



Proximal Ø15.7mm

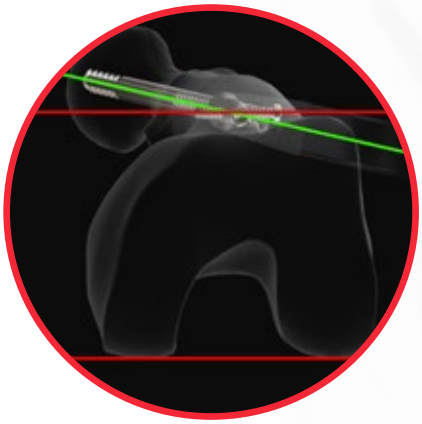
Axial Set Screw

3 CCD Angles
120°
125°
130°

DyCon® Screw Pair
Controlled Dynamization
Rotational Stability through 2-portal approach
See details p. 16

4° lateral bend

12° Anteversion
of Femoral Neck



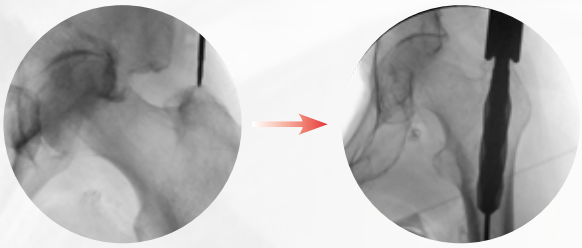
Length-dependent Antecurvatures
See details p. 14

Distal Locking
Ø5mm Screws
Horizontally oriented - True M-L
Static and Dynamic options

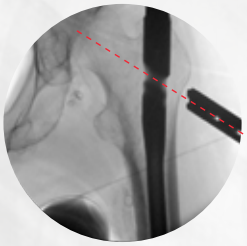
Surgical Technique Overview

With the aim of optimizing the flow of surgery and minimizing the risk of user error, the surgical technique for the HIP-G Nail follows an intuitive step-by-step working pattern.

Operative Access to the Trochanter

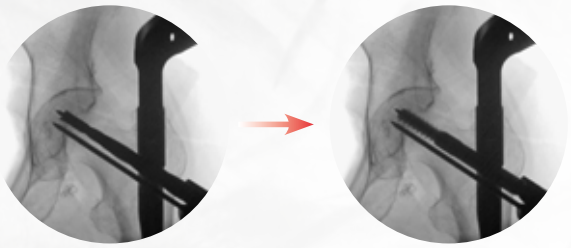


Insertion of the Intramedullary Nail

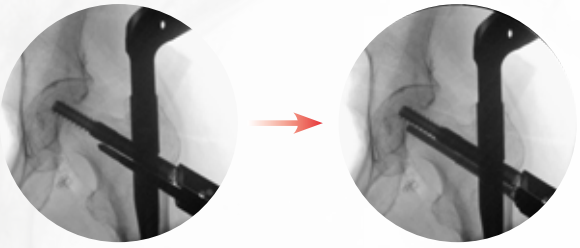


Drill-wire Placement

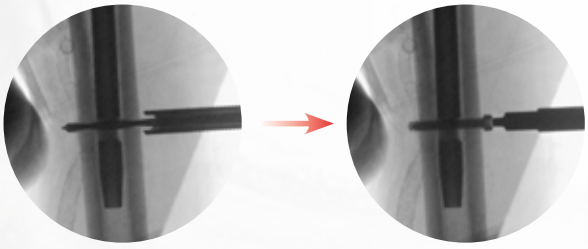
Lag Screw Insertion

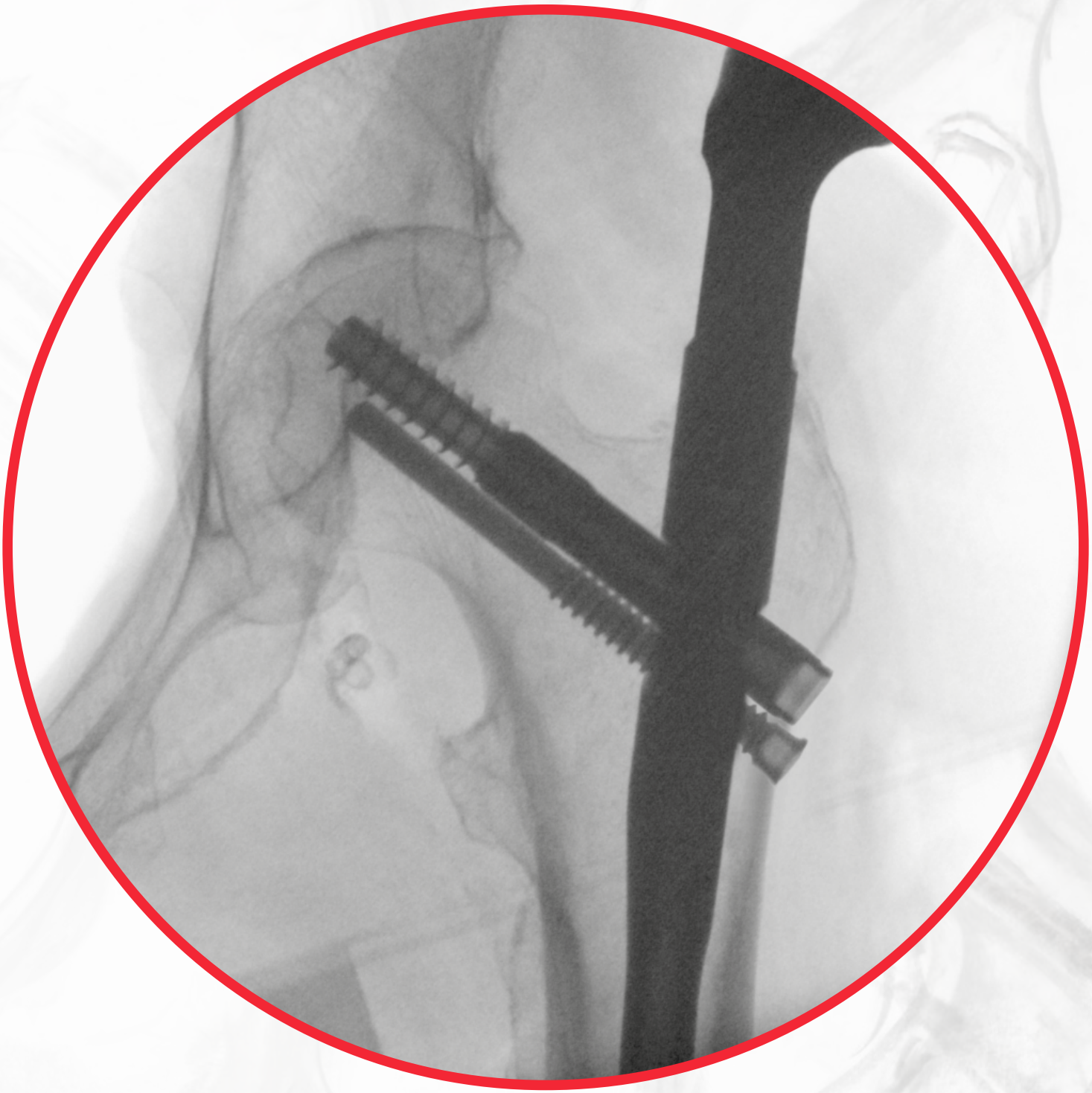


DyCon Set Screw Insertion



Guided Distal Locking

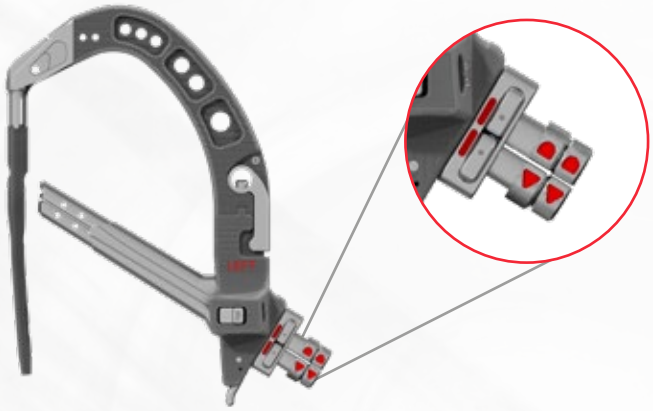




Instrument Design Features

Instrument platform of basic (=used throughout the HIP-G system) and dedicated instruments

- PF Basic set provides all instrumentation needed for short & intermediate nailing
- PF Optional set provides long nail instruments and all options (Correction of Trochanteric Entry Point/Lag Screw Drill Wire, Closure of a Fracture Gap, Free selection of Dynamic Control , Advanced Compression, End Cap Screws & Axial Set Screw)

Modular target device with focus on precision and ease of use • Color coding and markings highlighted	
Center tip 4.2mm drills to reduce wandering on cortex	
Diamond tip threaded drill-wire to reduce deflection (Precision Drill Wire)	

Uncontrolled Dynamization

Solution: Adjustable dynamization of the lag screw

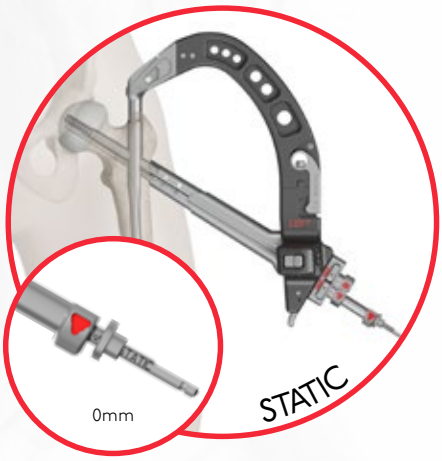
3 options:

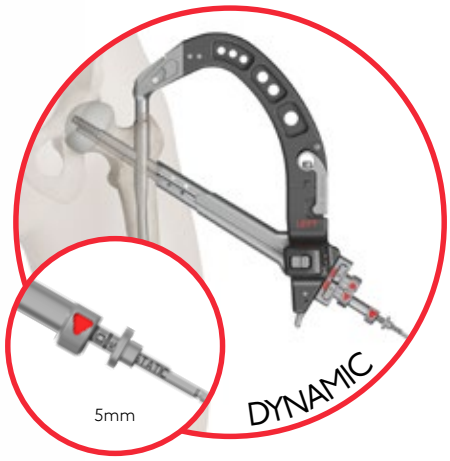
- „Static“
- „Dynamic“ = 5mm lateral migration
- „Dynamic +“ = 10mm lateral migration

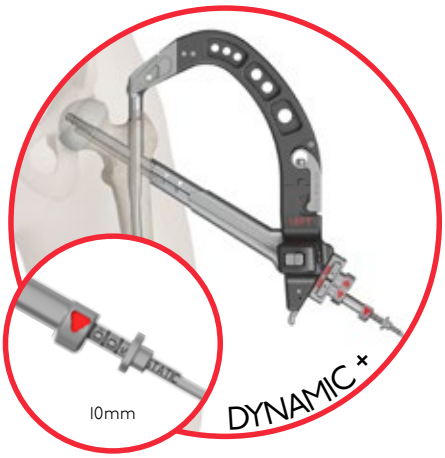
- Essentially also freely selectable

Additional Set Screw options

- Short Set Screw
- Axial Set Screw (Stand alone or combined)
- End Caps





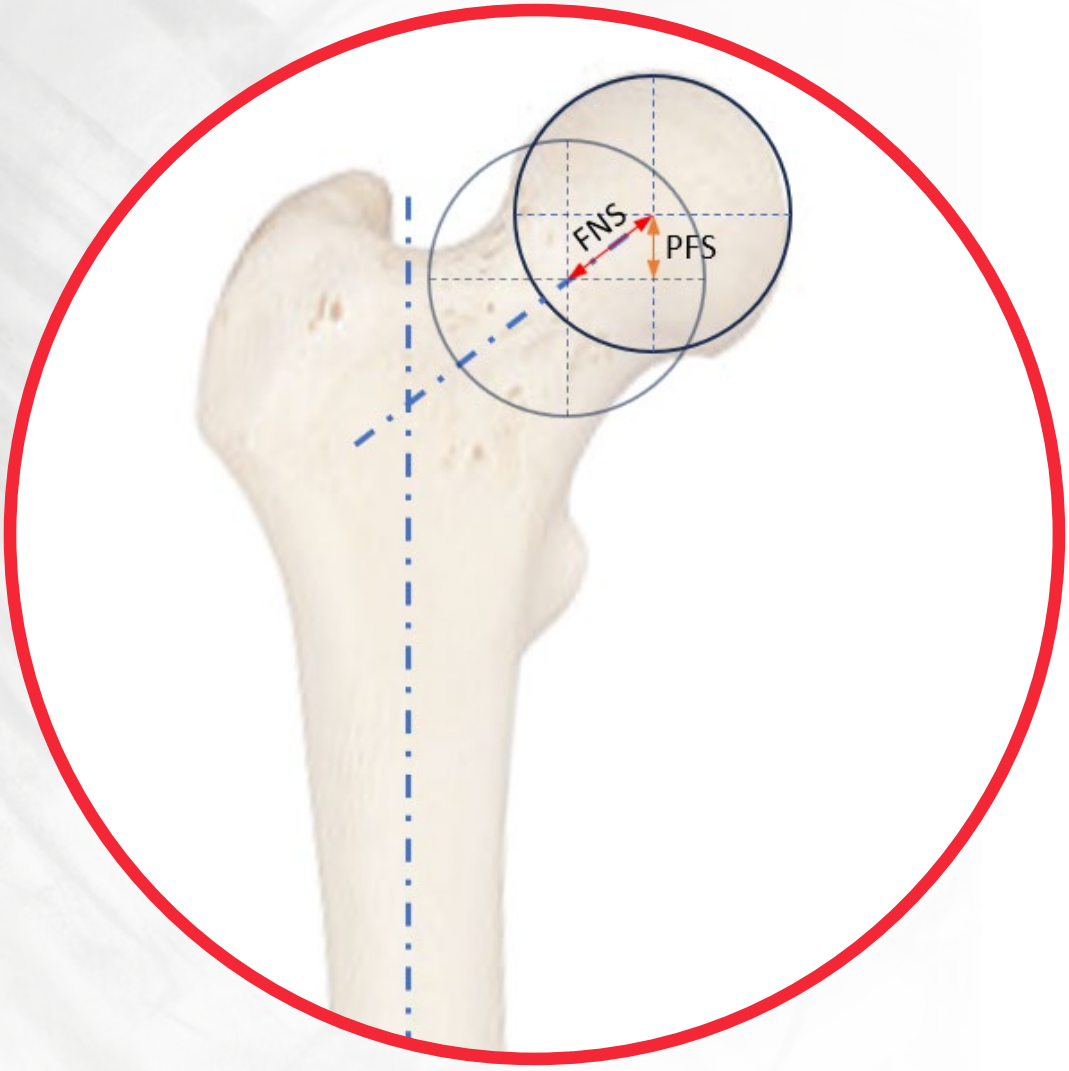


Lateral Dynamization

- Is the gold standard
- Is neccessary to follow the concept of dynamic osteosynthesis
- If excessive can create issues like
  - persistent pain
  - soft tissue irritation
  - negative impact on hip biomechanics (insufficiency of abductor muscles)
  - delayed recovery
- Is not wanted for some indications (tumour indications, young (sportive) patients)

Lateral Dynamization FNS, PFS
geometric relationship

FNS = Femoral Neck Shortening
PFS = Proximal Femur Shortening



*PFS= FNS*sin(CCD-90°)*

PFS	sin(CCD-90°)	FNS
1	0,57	1,7
2	0,57	3,5
3	0,57	5,2
4	0,57	7,0
5	0,57	8,7
6	0,57	10,5
7	0,57	12,2
8	0,57	13,9
9	0,57	15,7
10	0,57	17,4

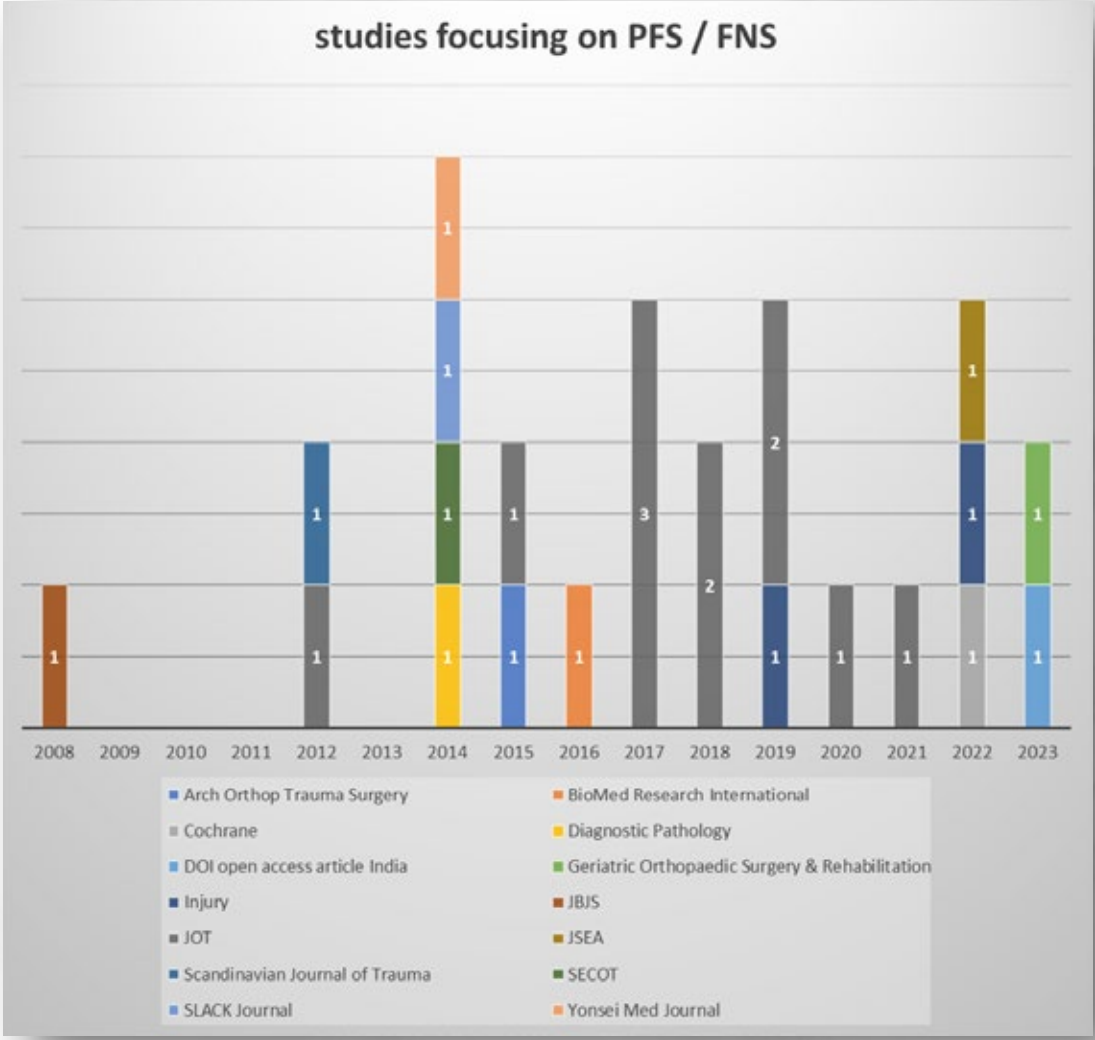
PFS	sin(CCD-90°)	FNS
11	0,57	19,2
12	0,57	20,9
13	0,57	22,7
14	0,57	24,4
15	0,57	26,2
16	0,57	27,9
17	0,57	29,6
18	0,57	31,4
19	0,57	33,1
20	0,57	34,9

Lateral Dynamization publications

Over the course of the last 15 years 25 publications addressed the topic of PFS/FNS. PFS/FNS has been identified as a parameter influencing „Quality of Life“ indicators and turned into a propsed classification of FNS:

- **Mild (<5mm)**
- **Moderate (5-10mm)**
- **Severe (>10mm)**

The key message emphasizes, *„The bigger the FNS, the poorer the functional outcomes.“* Additionally, it‘s noted that femoral head rotation increases the risk of FNS.*
Furthermore, the finding suggest that 2 screws system produce better outcomes reg. FNS**



* **2014** Diagnostic Pathology, Wu et al, InterTan nail versus Gamma3 nail for intramedullary nailing of unstable trochanteric fractures. Diagnostic Pathology 2014 9:191

2019 JOSR, Yoo et al, Gamma 3 U-Blade lag screws in patients with trochanteric femur fractures: are rotation control lag screws better than others

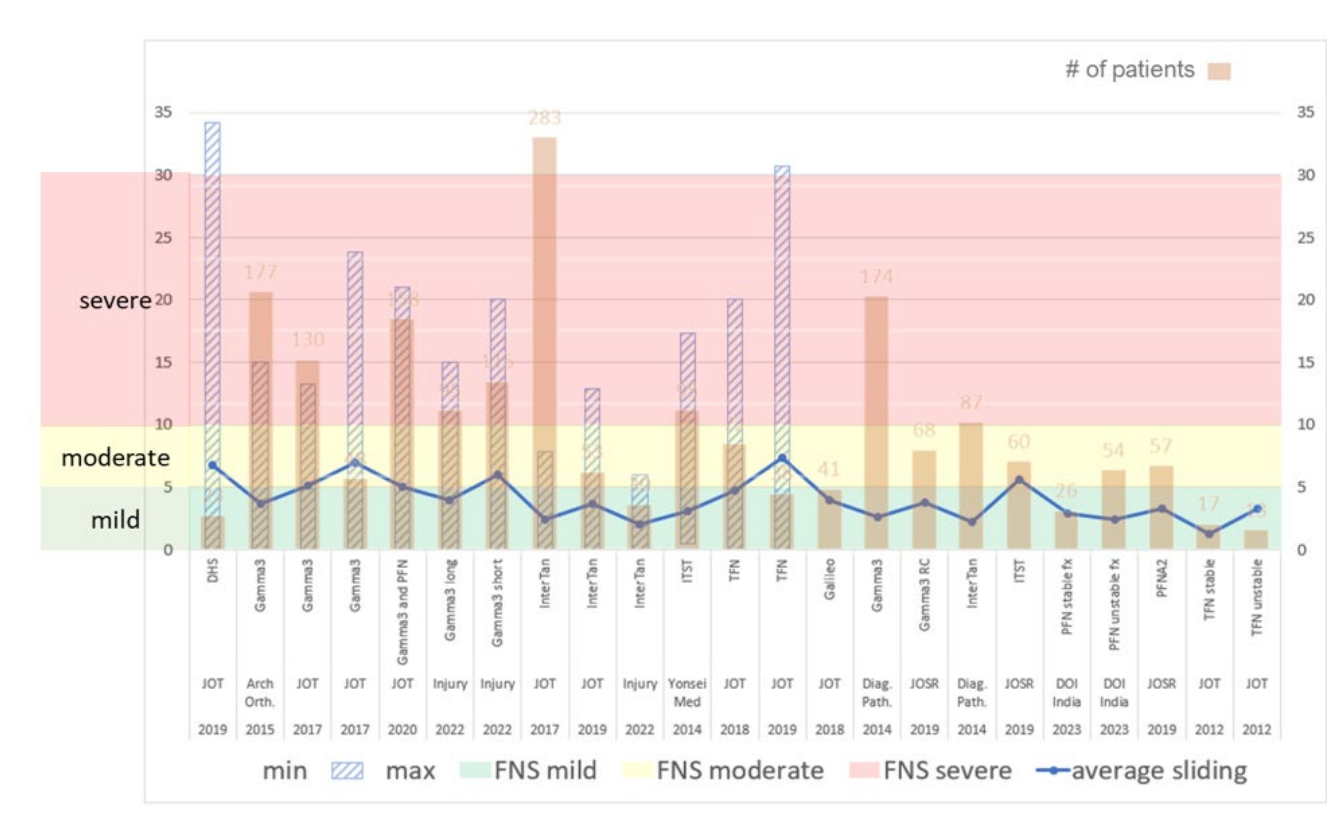
** **2022** INJURY, Goto et al, Postoperative subtype P as a risk factor for excessive postoperative sliding of cephalomedullary nail in femoral trochanteric fractures in old patients, A case series of 263 patients using computed tomography analysis

2017 JOT, Serrano et al, CEPHALOMEDULLARY NAIL FIXATION OF INTERTROCHANTERIC FRACTURES: ARE TWO PROXIMAL SCREWS BETTER THAN ONE?

2019 JOT, Ricci et al, Are Two-Part Intertrochanteric Femur Fractures Stable and Does Stability Depend on Fixation Method?

Lateral Dynamization quantified per product

Thirteen studies collectively quantify the **FNS**, utilizing a total of 23 data sets per product (1,914 patients), with 13 data sets specifically analyzing the minimum and maximum values of **FNS** (1,317 patients).
The **key messages** reveal that the average **FNS** across the 23 data sets is 3.85mm (ranging from 1.2 to 7.3mm), placing all systems in the "mild" to "moderate" **FNS** range.
However, in the case of maximum **FNS** across 13 data sets, 77% of the studies show outliers in the severe range.



1	2019 JOT, Ricci et al, Are Two-Part Intertrochanteric Femur Fractures Stable and Does Stability Depend on Fixation Method?
2	2015 Arch Orthop Trauma Surgery, Ito et al, Prevention of excessive postoperative sliding of the short femoral nail in femoral trochanteric fractures
3	2017 JOT, Serrano et al, CEPHALOMEDULLARY NAIL FIXATION OF INTERTROCHANTERIC FRACTURES: ARE TWO PROXIMAL SCREWS BETTER THAN ONE?
4	2017 JOT, Gilat et al, Proximal Femoral Shortening After Cephalomedullary Nail Insertion for Intertrochanteric Fractures
5	2020 JOT , Parry et al, Variables Associated With Lag Screw Sliding After Single-Screw Cephalomedullary Nail Fixation of Intertrochanteric Fractures
6	2022 INJURY, Goto et al, Postoperative subtype P as a risk factor for excessive postoperative sliding of cephalomedullary nail in femoral trochanteric fractures in old patients, A case series of 263 patients using computed tomography analysis
7	2022 INJURY, Goto et al, Postoperative subtype P as a risk factor for excessive postoperative sliding of cephalomedullary nail in femoral trochanteric fractures in old patients, A case series of 263 patients using computed tomography analysis
8	2017 JOT, Serrano et al, CEPHALOMEDULLARY NAIL FIXATION OF INTERTROCHANTERIC FRACTURES: ARE TWO PROXIMAL SCREWS BETTER THAN ONE?
9	2019 JOT, Ricci et al, Are Two-Part Intertrochanteric Femur Fractures Stable and Does Stability Depend on Fixation Method?
10	2022 INJURY, Goto et al, Postoperative subtype P as a risk factor for excessive postoperative sliding of cephalomedullary nail in femoral trochanteric fractures in old patients, A case series of 263 patients using computed tomography analysis
11	2014 Yonsei Med Journal, Song et al, Presence of a Nail in the Medullary Canal; Is It Enough to Prevent Femoral Neck Shortening in Trochanteric Fractures?
12	2018 JOT, Gausden et al, Gait Analysis After Intertrochanteric Hip Fracture Does Shortening result in gait impairment?
13	2019 JOT, Ricci et al, Are Two-Part Intertrochanteric Femur Fractures Stable and Does Stability Depend on Fixation Method?
14	2018 JOT, Jagow et al, Galileo A novel technique for the fixation of inter-trochantieric hip fractures: A telescoping lag screw
15	2014 Diagnostic Pathology, Wu et al, InterTan nail versus Gamma3 nail for intramedullary nailing of unstable trochanteric fractures. Diagnostic Pathology 2014 9:191
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19	2023 DOI open access article India, Kund et al, Parameters Governing the Fate of Fracture Fixation With Proximal Femoral Nailing (PFN) for Intertrochanteric Femur Fractures. Cureus 15(6): e40952. DOI 10.7759/cureus.40952
20	2023 DOI open access article India, Kund et al, Parameters Governing the Fate of Fracture Fixation With Proximal Femoral Nailing (PFN) for Intertrochanteric Femur Fractures. Cureus 15(6): e40952. DOI 10.7759/cureus.40952
21	2019 JOSR, Yoo et al, Gamma 3 U-Blade lag screws in patients with trochanteric femur fractures: are rotation control lag screws better than others
22	2012 JOT, Paul et al, Functional and Radiographic Outcomes of Intertrochanteric Hip Fractures Treated With Calcar Reduction, Compression, and Trochanteric Entry Nailing aul, Omesh MD*; Barker, Joseph U. MD†; Lane, Joseph M. MD*; Helfet, David L. MD*; Lorich, Dean G. MD*
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COMPANY	ITS.	Stryker		Smith & Nephew	Synthes	Zimmer Biomet		Altior	Arthrex (AOS)	Orthofix
System Name	Intramedullary Nail System (HIP-G)	Gamma 3	Gamma 4	Intertan	TFNA	Affixus	Zimmer Natural Nail	Artemis	Galileo	Chimaera
Material	Ti6Al4V Type II Anodization	Ti6Al4V Type II Anodization	Ti6Al4V Type II Anodization	Titanium alloy Type III Anodization	Ti-15Mo (TiMo)	Titanium	Ti-6Al-4V alloy	Titanium alloy core (Ti6Al4V) encompassed by injection molded carbon fiber reinforced (CFR) polyether ether ketone (PEEK).	Titanium alloy	Titanium alloy with anodized type II surface treatment
SHORT NAIL										
Lengths	180mm	170mm 180mm 200mm	170mm	180mm 200mm	170mm 200mm	180mm	215mm	180mm	170mm 200mm	180mm
Versions	Left/Right	Unilateral	Unilateral	Unilateral	Unilateral	Unilateral	Left/Right	Unilateral	Unilateral	Unilateral
ROC	1100mm	-	-	-	-	-	1275mm	-	-	-
Proximal diameters	15.7mm	15.5mm	15.5mm	15.25/16.25mm (trapezoidal shape)	15.66mm	15.6mm	15.5mm	10 / 11.5 / 13 / 14.5mm	15.9mm	15.5mm
Distal diameters	10mm	170mm: 10mm 180mm: 11mm 200mm: 11 / 12mm	9 / 10 / 11 / 12 / 13mm	10 / 11.5 / 13mm	9 / 10 / 11 / 12mm	9 / 11 / 13mm	10 / 11.5 / 13 / 14.5mm	11mm	9 / 10 / 11 / 12 / 13mm	10 / 11mm
Anteversion	12°	-	-	-	-	-	-	-	-	-
INTERMEDIATE NAIL										
Lengths	240mm	-	240mm	-	235mm	-	-	-	-	-
Versions	Left/Right	-	Left/Right	-	Left/Right	-	-	-	-	-
Distal diameters	10 / 12mm	-	9 / 10 / 11 / 12 / 13 mm	-	9 / 10 / 11 / 12 mm	-	-	-	-	-
ROC	1100mm	-	750mm	-	1000mm	-	-	-	-	-
Anteversion	12°	-	10°	-	-	-	-	-	-	-
LONG NAIL										
Lengths	260 - 480mm	260 - 480mm	240 - 480mm	260 - 460 mm	300 - 480mm	260 - 460mm	300 - 460mm	300 - 440mm	300 - 420mm	280 - 460mm
Versions	Left/Right	Left/Right	Left/Right	Left/Right	Left/Right	Left/Right	Left/Right	Left/Right	Left/Right	Left/Right
ROC	Length dependent (900, 1100, or 1250mm)	1.5m (10, 11, 13mm) 2m (11, 13, 15mm)	Length dependent (750-1350 - different for each nail length)	1500mm	1000mm	1800mm	Length dependent (1275, 1400 or 1525mm)	Length dependent	Length dependent (900, 1000 or 1300mm)	1500mm
Distal diameters	9 / 10 / 12 / 14mm	10 / 11 / 13 / 15mm	9 / 10 / 11 / 12 / 13 / 15mm	10 / 11.5 / 13mm	9 / 10 / 11 / 12 / 14mm	9 /11 / 13mm 15mm (130° only)	10 / 11.5 / 13mm	11mm	10 / 11 / 14mm (ES Nail only)	10 / 11mm
Anteversion	12°	10°	10°	12°	10°	10°	15°	-	10°	10°
LAG SCREWS										
Material	Ti6Al4V Type II Anodization	Ti6Al4V Type II Anodization	Ti6Al4V Type II Anodization		Ti6Al-7Nb (TAN)	Titanium	Ti-6Al-4V alloy	Titanium alloy		Titanium
Diameter	10.5mm	10.5mm	10.5mm	11mm	10.35mm	10.5mm	10,5mm	11mm	10.5mm	10,5mm

COMPANY	ITS.	Stryker		Smith & Nephew	Synthes	Zimmer Biomet		Altior	Arthrex (AOS)	Orthofix
LAG SCREWS										
Lag Screw lengths	70 - 130mm	70-130mm	70 - 130mm	70 - 125mm	70 - 130mm	70 - 130mm	70 - 130mm	70 - 130mm	85mm - 120mm (Galileo) 70mm - 120mm (Solic Locking Lag Screw & Lag Screw)	70 - 130mm
Increments	5mm	5mm	5mm	5mm	5mm	5mm	5mm	5mm (2.5mm for most common lengths)	-	5mm
Compression Option	Yes - 2 options	Yes	Yes	Yes with compression screw	Yes	Yes	Yes	-	-	-
SET SCREW										
Type	Inferior	Superior	Superior preloaded	Superior preloaded	Superior preloaded	Superior preloaded	Superior	Superior preloaded	None (i.e.Self-locking) for Telescoping & Solid locking Lag Screws) Superior for Standard Lag Screw	None (i.e.Self-locking Lag Screw)
Dynamization Control	Yes - freely selectable	No	No	No	No	No	No	No	No	No
Additional Option	Axial Set Screw (Stand alone or combined)	-	-	-	-	-	-	-	-	-
SECOND FEMORAL HEAD SCREW										
Function	Set Screw	-	-	Compression	-	Anti-rotation screw	-	Anti-rotation wire (instrument only)	Anti-rotation screw	Anti-rotation screw
Placement	Inferior	-	-	Inferior	-	Superior	-	Inferior	Superior	Superior
Diameter	6.6mm (5.0mm shaft)	-	-	7.8mm non-threaded lateral part 7.0mm threads	-	5mm	-	-	5mm	6mm
Lengths	Corresponds to length of Lag Screws (70 - 130mm)	-	-	65 - 120 mm (Only sold in pack with corresponding Lag Screw - Lag Screw 5mm longer)	-	50 - 110mm	-	-	60 - 110mm	60 - 120mm
DISTAL SCREW										
Diameter	5.0mm	5.0mm	5.0mm	5.0mm	5.0mm	5.0 mm	5.0 mm	5.0mm	5.0mm	5.0mm
Lengths	25 - 120mm	25 -50mm 55 - 120mm (optional)	25 - 120mm	25 - 50mm (standard) 55 - 110mm (optional)	26 - 100mm	20 - 80mm	20 - 100mm	25 - 110mm	30 - 120mm	25 - 90mm
Increments	2.5mm (25-70mm) 5mm (70-120mm)	2.5mm (25-50mm) 5mm (55-120mm)	2.5mm (25-60mm) 5mm (60-120mm)	5mm	2mm (26-80mm) 5mm (80-100mm)	2mm (20-60) 5mm (60-80)	2.5mm (20-60mm) 5mm (60-100mm)	2.5mm (up to 50mm) 5mm (up to 110mm)	-	5mm
END CAPS										
Height	0, 5, 10, 15, and 20mm	0mm, 5mm and 10mm	0mm, 5mm, 10mm, 15mm	0mm	0, 5, 10, 15mm	0, 5mm In Cap Flush impinging	0, 5, 10, 15mm	-	1, 5, 10, Captured	0, 5, 10, 15mm

Disclaimer:

The intended users are limited to medical personnel with appropriate product training by the medical product consultants or knowledge of the surgical procedure to be applied. The medical staff must ensure that the use of I.T.S. GmbH medical devices is appropriate, taking into account the medical condition and medical history of the patient. Prior to product use, medical personnel must refer to complete information on product label and in IFU, including, but not limited to, indications, contraindications, warnings and preventative measures, and cleaning and sterilization instructions. Product availability is dependent on country registrations and clearances. For more information, please visit www.its-implant.com or contact us at office@its-implant.com. All information herein is the intellectual property of I.T.S. GmbH.

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Order No. INSPF-SB-0126-US
Edition: January/2026