medartis®

PRECISION IN FIXATION

PRODUCT INFORMATION

Proximal Humerus System 3.5

APTUS® Shoulder

Contents

3 New Treatment Concept for Proximal Humerus Fractures
4 Proximal Humerus System 3.5
6 Portfolio
7 Fracture Treatment Concept
8 Spiral Blades
10 Technology, Biomechanics, Screw Features
12 Precisely Guided Screw Placement
13 Placement of the Spiral Blade
14 Storage
15 Ordering Information
23 Bibliography

For further information regarding the APTUS product line visit:
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New Treatment Concept for Proximal Humerus Fractures

A fracture of the proximal humerus is one of the most common fractures in the human body[3]. Usually due to osteoporosis, the fracture risk is twice as high in women compared to men[2], especially in persons aged 60 and older. A high increase of these fractures is expected due to demographic change[12].

Despite the achievement of good functional results in the fixation of these fractures, the rate of complications remains high. The most frequent complications are loss of reduction, screw perforation into the glenoid, malunion and avascular necrosis[5, 11, 13].

Scientific literature refers to factors such as the anatomical reconstruction, the local bone density, the patient's age and in particular the quality of the reconstruction of the mechanical medial calcar support as good indicators for the treatment success. Reaching a stable support in the calcar region is particularly crucial in the case of poor bone quality[4, 6–8, 10].

The APTUS system for the proximal humerus addresses this challenge. The plate can be combined with an optional spiral blade in the humeral head to provide additional calcar support. This reduces the risk of a secondary varus displacement of the humeral head[1]. The plate has a very good anatomical fit and the multidirectional and angular stable locking technology TriLock allows for a targeted fixation of each fracture fragment. The new treatment concept thus offers a high degree of flexibility for the fracture management according to the individual needs.

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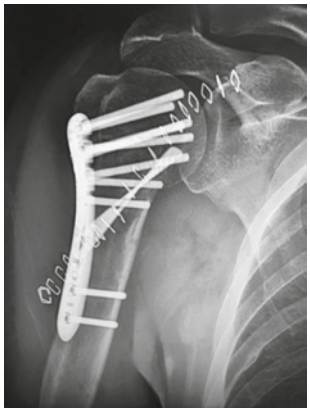
Proximal Humerus System 3.5

Clinical benefits

- The asymmetrical form of the plate with posterior screw holes supports the fixation of the greater tubercle.
- The anterior twist of the implant shaft may offer protection of the deltoid insertion.
- Optional spiral blades reduce the risk of secondary varus displacement of the humeral head by means of additional calcar support [1].
- Spiral blades in a 40° or 50° angle allow for a flexible approach to the individual fracture pattern.
- Two TriLock screws passing through the spiral blade increase the overall stability of the construct.
- Suture holes with rounded edges facilitate soft tissue fixation with the plate already in position.
- Diverging screw orientation in the proximal area supports a stable bone purchase.
- Uniform screw diameter of 3.5 mm for TriLock screws and cortical screws

A/P and axillary view of a varus impacted fracture in a 60-year old female

Intraoperative view of soft tissue fixation



Postoperative X-ray control with anatomical reconstruction and use of the 40° spiral blade

Clinical case published with the kind permission of: A. Greenberg, Manhasset, USA

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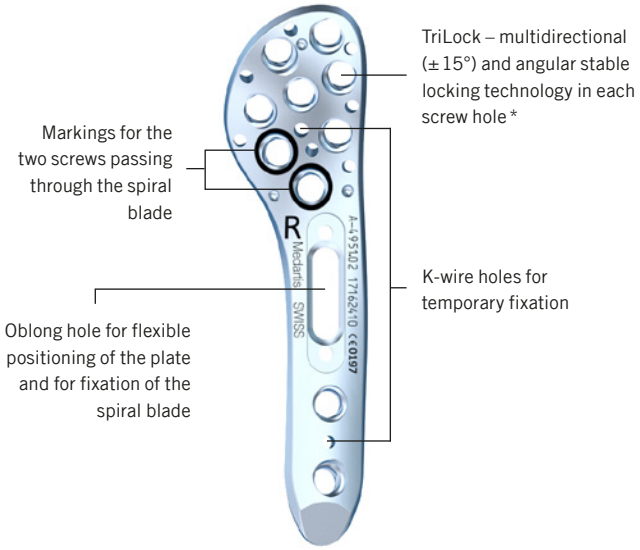
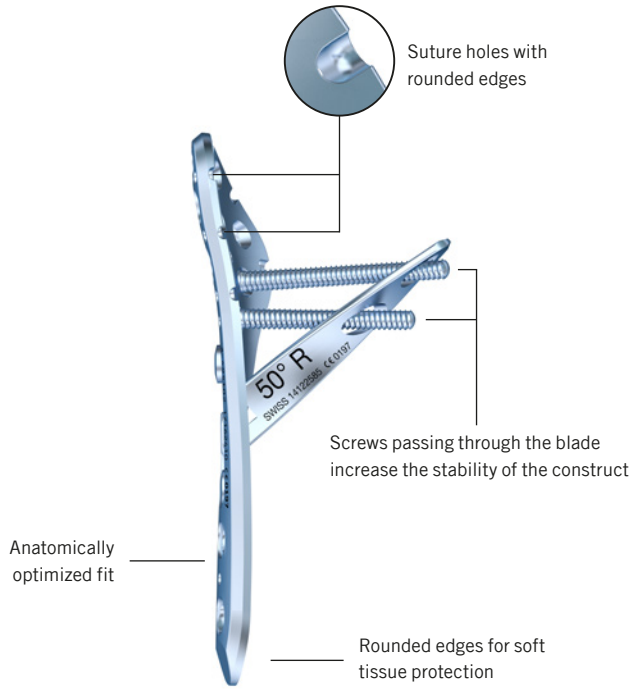
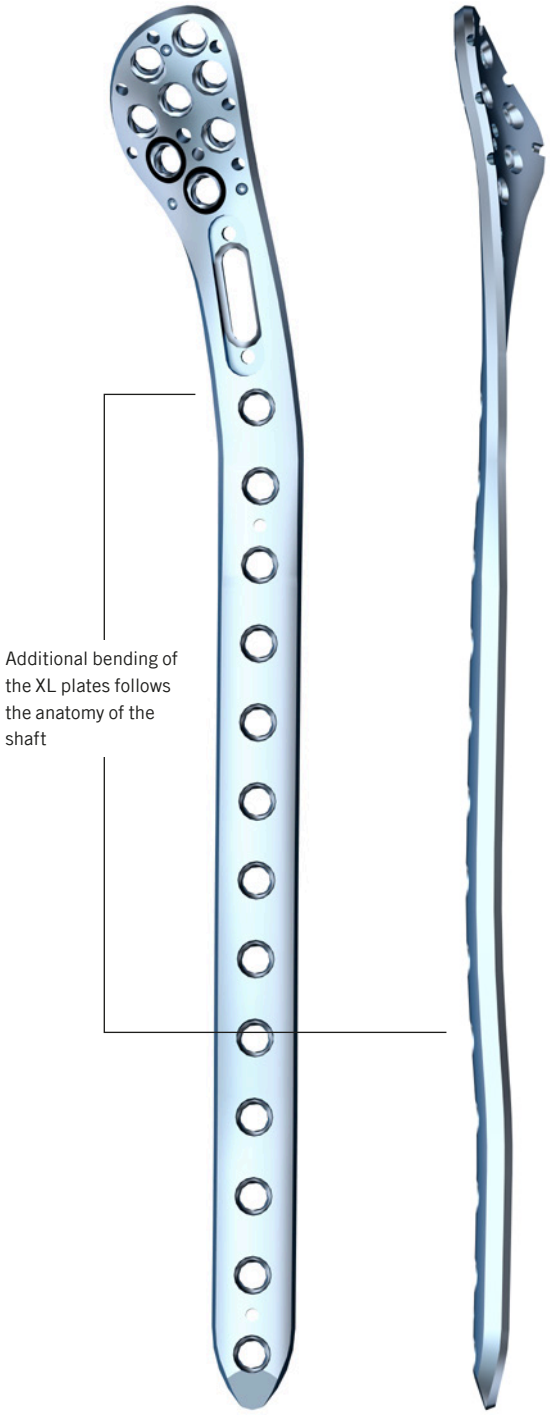
Plate features







* Exception: oblong hole

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Portfolio

The plates of the APTUS Proximal Humeral System 3.5 are available in five lengths and in a left and a right version. Depending on the fracture pattern and anatomy, they can be combined with a 40° or 50° spiral blade.

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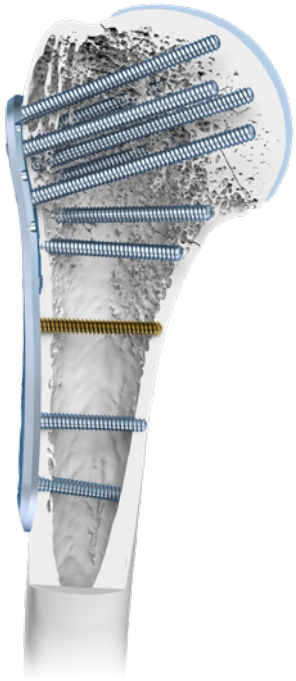
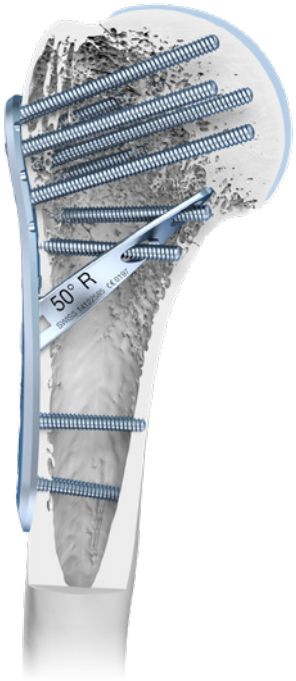
Fracture Treatment Concept

The proximal humeral plate can be used alone or in combination with one of the spiral blades. This flexibility allows to treat fractures individually. The spiral blades further stabilize the plate-screw-construct in the calcar region. Providing this support reduces the risk of a varus displacement of the humeral head [1].

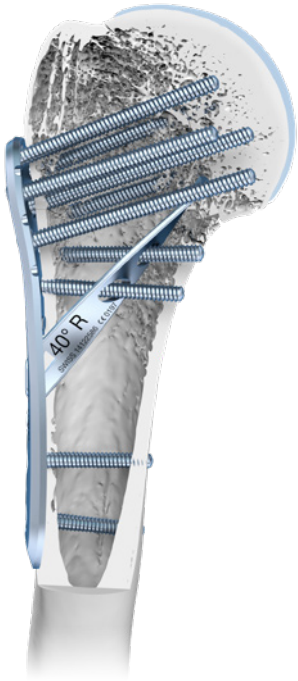
The use of a spiral blade is recommended for the treatment of a fracture type which requires a particularly good medial support of the proximal humerus, and in case of poor bone quality.
In addition, the XL plate types of the system are suitable for the management of fracture patterns that extend to the humeral shaft. *



Without spiral blade



With spiral blade 50°



With spiral blade 40°

* The above-mentioned information is a recommendation only. The operating surgeon is solely responsible for the choice of the suitable implant for the specific case.

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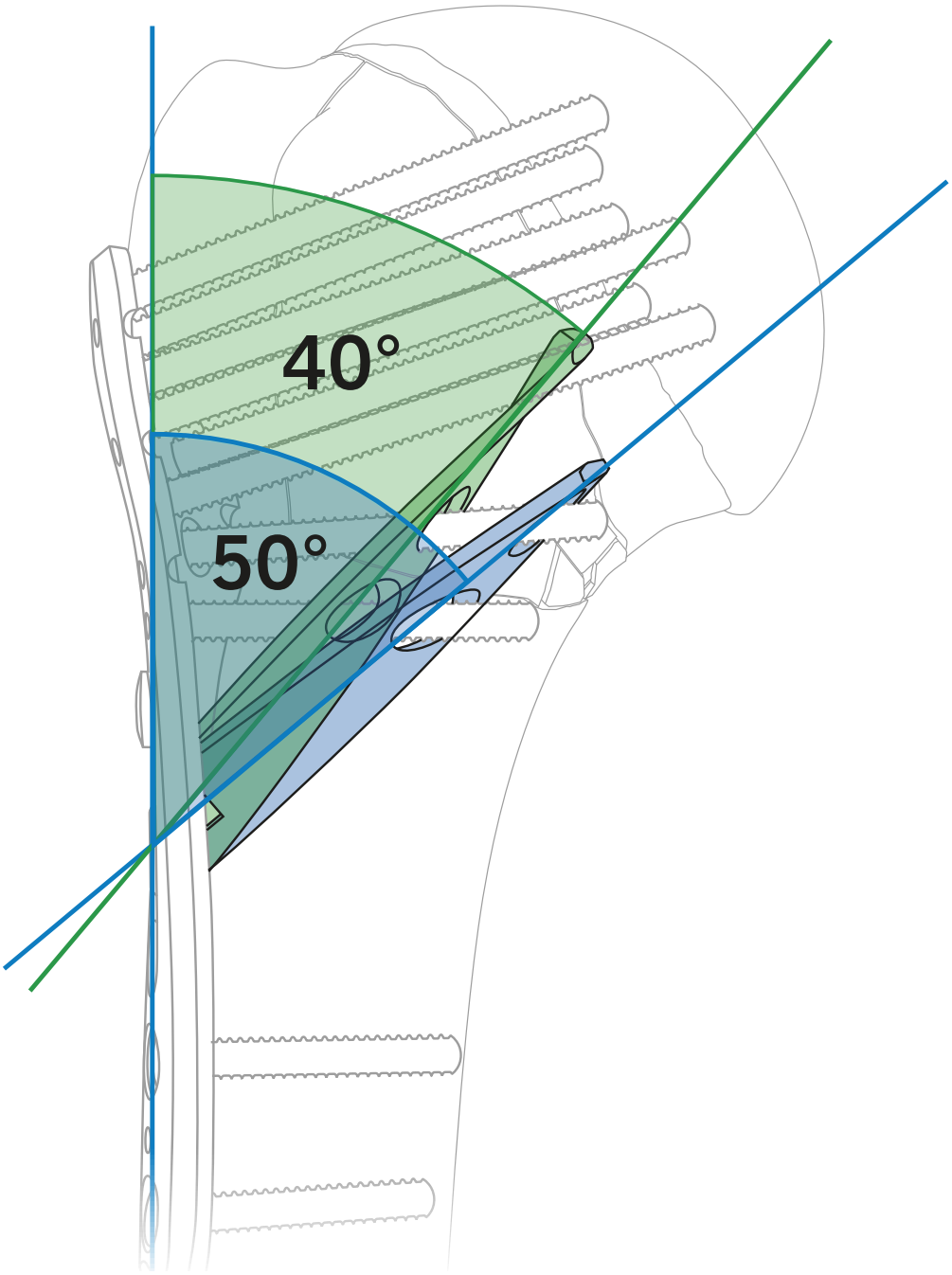
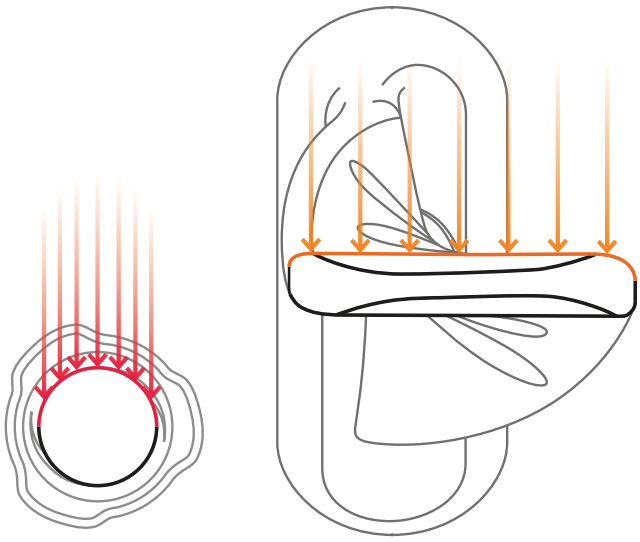
Spiral Blades

Based on thorough analysis of extensive CT data on bone density distribution in the proximal humerus, two spiral blades in a different angle each were developed.

The available options are 40° or 50°. The angle of the spiral blade is determined intraoperatively.



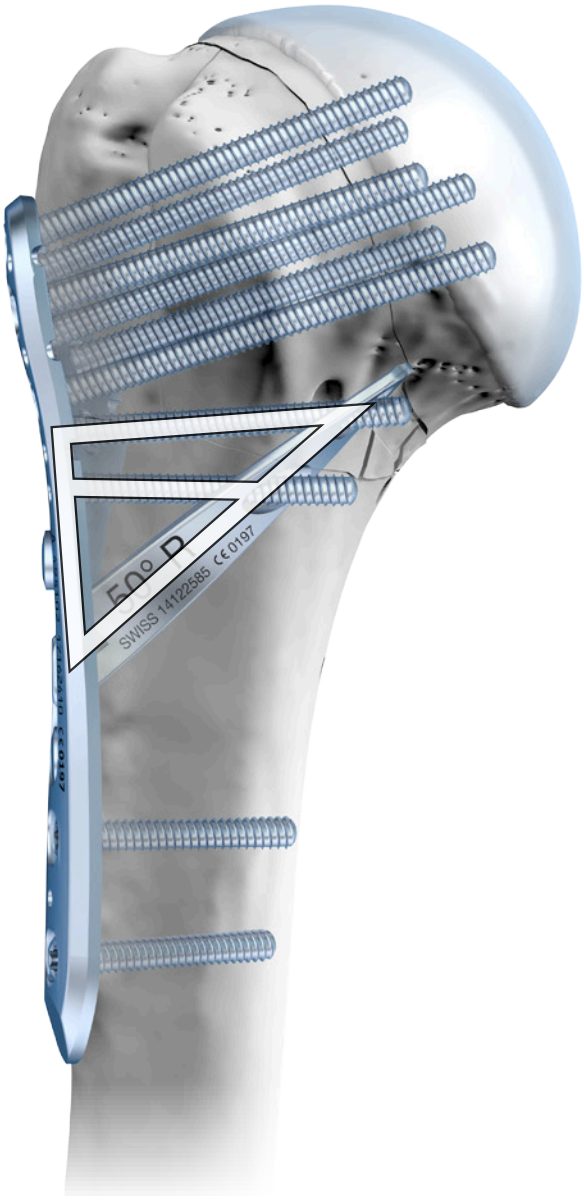
→ www.medartis.com/products/aptus/shoulder



Calcar screw

Spiral blade

Due to its flat form, the spiral blade has a larger contact surface within the bone than a conventional screw.



The two screws which pass through the spiral blade provide additional stability to the construct.

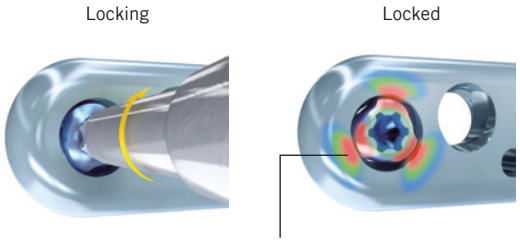
→ www.medartis.com/products/aptus/shoulder

Technology, Biomechanics, Screw Features

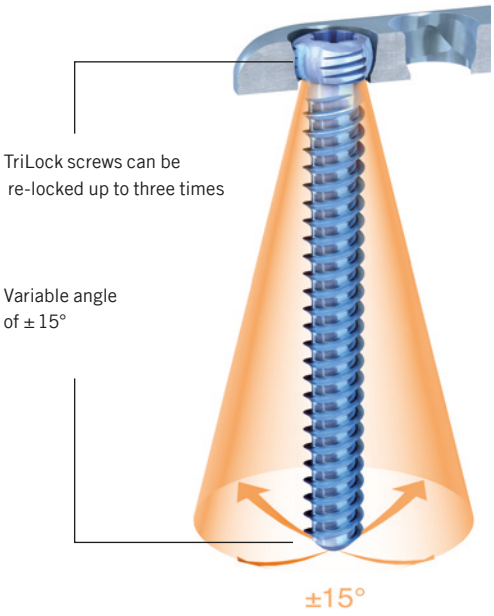
Multidirectional and angular stable TriLock® locking technology

TriLock Technology

- Patented TriLock locking technology – multidirectional locking of the screw in the plate
  - Spherical three-point wedge-locking
  - Friction locking through radial bracing of the screw head in the plate without additional tensioning components
- Screws can pivot freely by ± 15° in all directions for optimal positioning
- Fracture fragments can be fine-tuned intraoperatively
- TriLock screws can be re-locked in the same screw hole at individual angles up to three times
- Minimal screw head protrusion thanks to internal locking contour
- No cold welding between plate and screws



TriLock locking technology — multidirectional locking of the screw in the plate

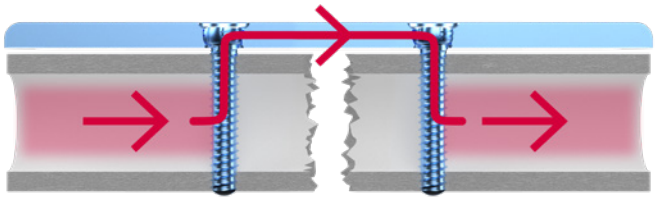


Completely countersunk screws

→ www.medartis.com/products/aptus/shoulder

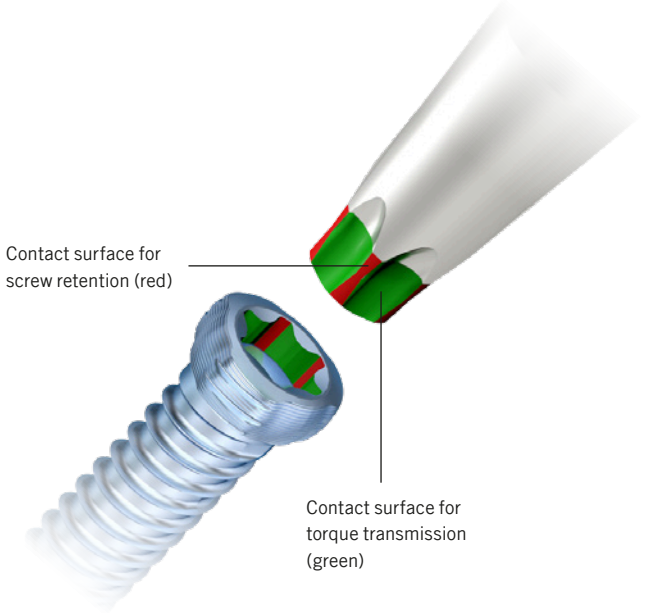
Biomechanics

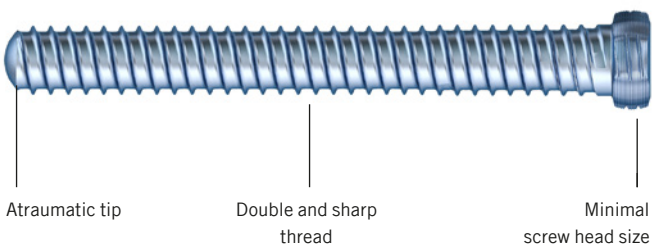
- Principle of the «Internal Fixator»
  - Stable connection between screw and plate facilitates the bridging of instable zones



Screw Features

- Patented HexaDrive screw head design:
  - Secure connection between screw and screwdriver
  - Increased torque transmission
  - Simplified screw pick-up due to patented self-holding technology
- Atraumatic screw tips
- Soft tissue protection due to smooth screw head design without sharp edges
- Double threaded TriLock screws reduce screw insertion time
- Increased torsional, bending and shear stability due to conical core
- Precision cut thread profile for sharpness and self-tapping properties





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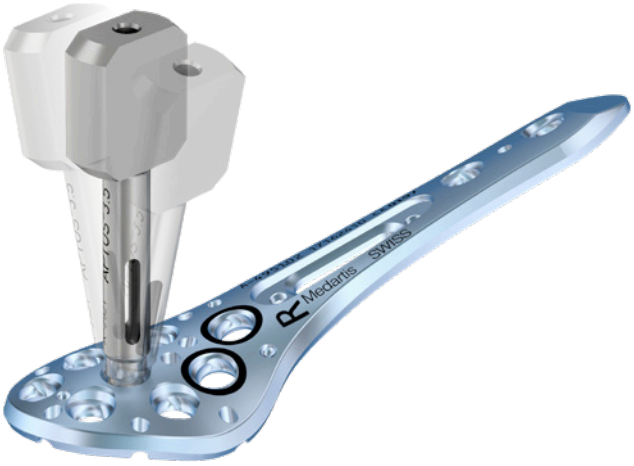
Precisely Guided Screw Placement

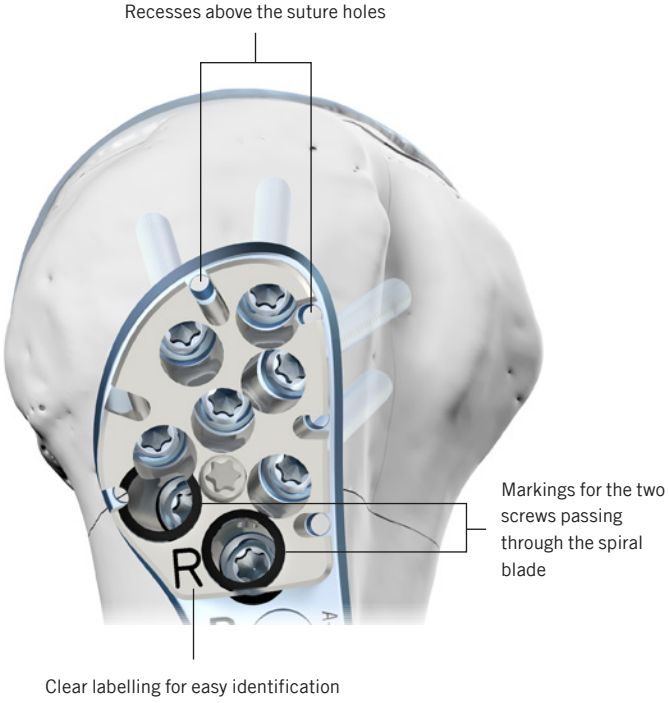
Self-Holding Drill Sleeve

- Can be locked in the selected angle within the TriLock contour of the plate
- Multidirectional ± 15°
- Allows for single-handed drilling



Drill Guide Block

- Guidance for a collision-free and diverging screw direction in the humeral head
- Fast screw placement and ease of use
- Recesses for using the suture holes even with the drill guide block in position
- Specific left and right drill guide block for all plates



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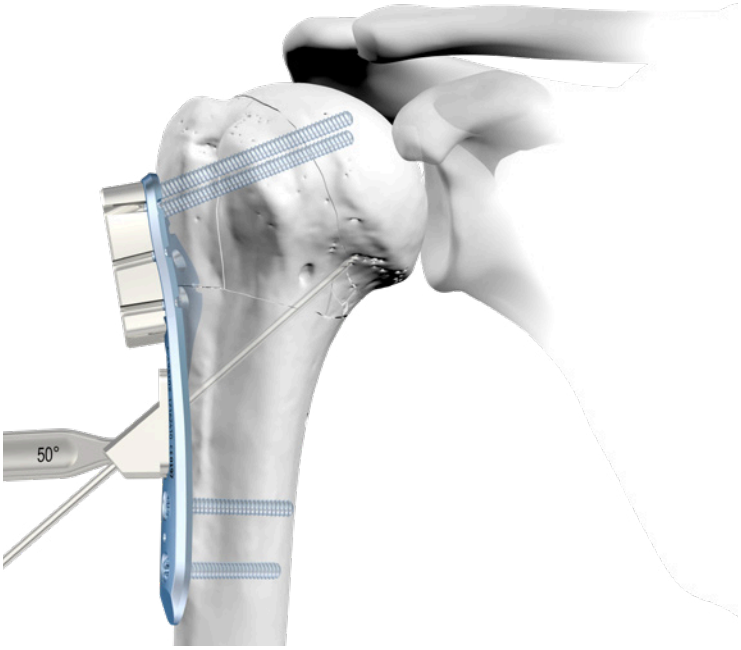
Placement of the Spiral Blade

All instruments that are used for placing the spiral blade are fixed in the oblong hole of the plate. The well-thought order of the operating steps focuses on maintaining the reduction of the fracture fragments.



Verification of the spiral blade angle by means of a K-wire.

Preparation of the channel for the spiral blade with a precisely guided spiral blade cutter.

→ www.medartis.com/products/aptus/shoulder

Storage

- Compact system
- Completely modular
- Easy to use
- Validated cleaning and sterilization of the implants
- User-friendly and clear configuration of the implants and instruments

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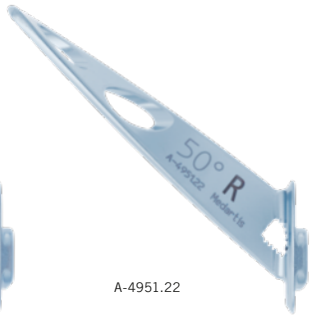
Ordering Information

Spiral Blades

Material: Titanium (ASTM F67)

A-4951.21



A-4951.22

A-4951.23

A-4951.24

Art. No.	Description	Pieces / Pkg
A-4951.21	left, 50°	1
A-4951.22	right, 50°	1
A-4951.23	left, 40°	1
A-4951.24	right, 40°	1

Screw for Spiral Blades

Material: Titanium (ASTM F136)

Art. No.	Pieces / Pkg
A-4951.30	1

Scale 1:1

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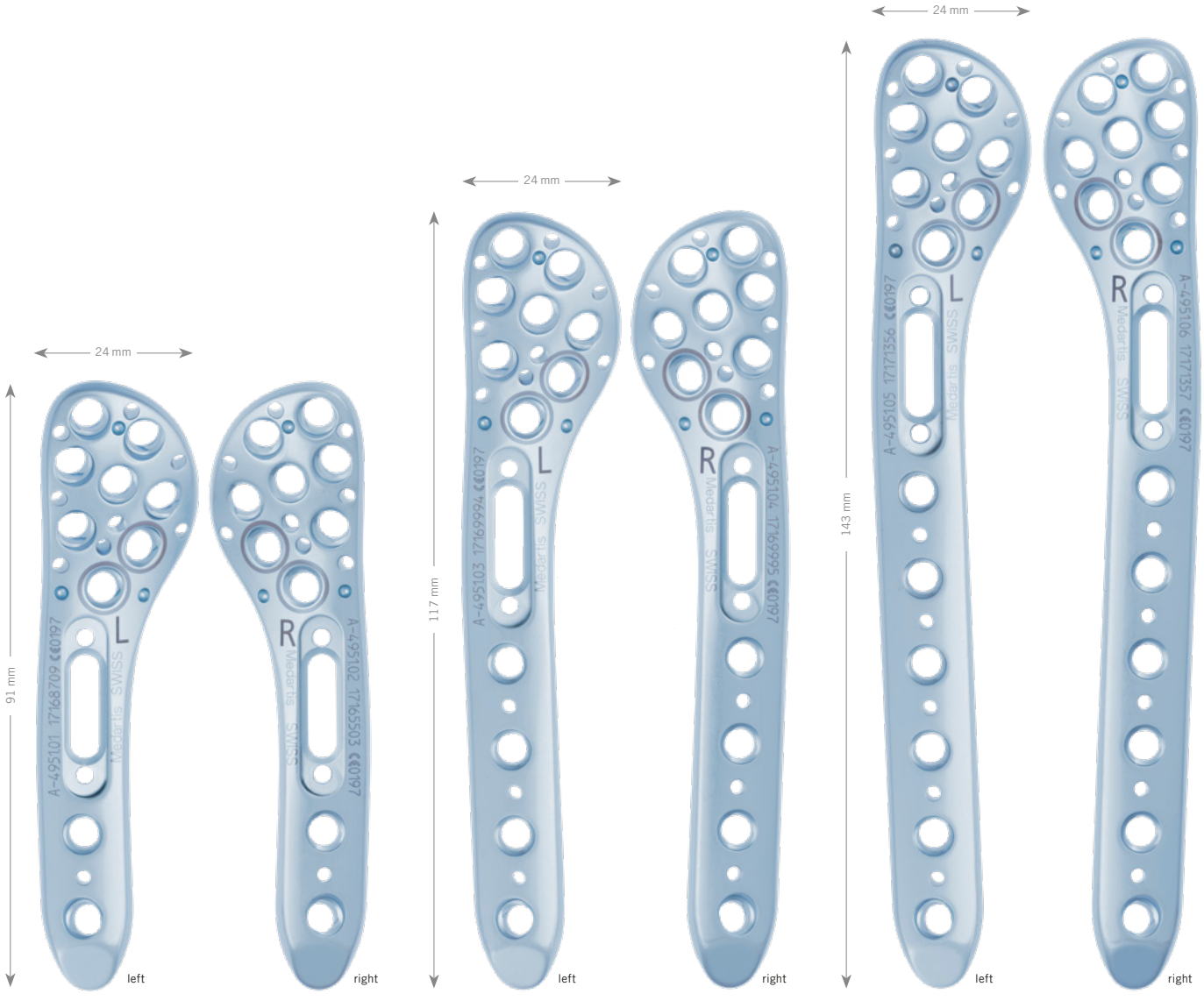
3.5 TriLock Proximal Humeral Plates

Material: Titanium (ASTM F67)
Plate thickness: 3.0 mm

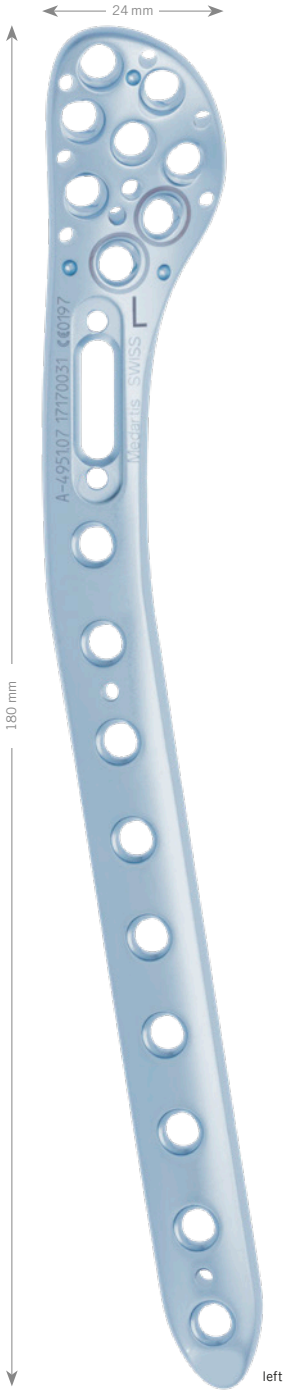


A-4951.01 A-4951.02 A-4951.03 A-4951.04 A-4951.05 A-4951.06

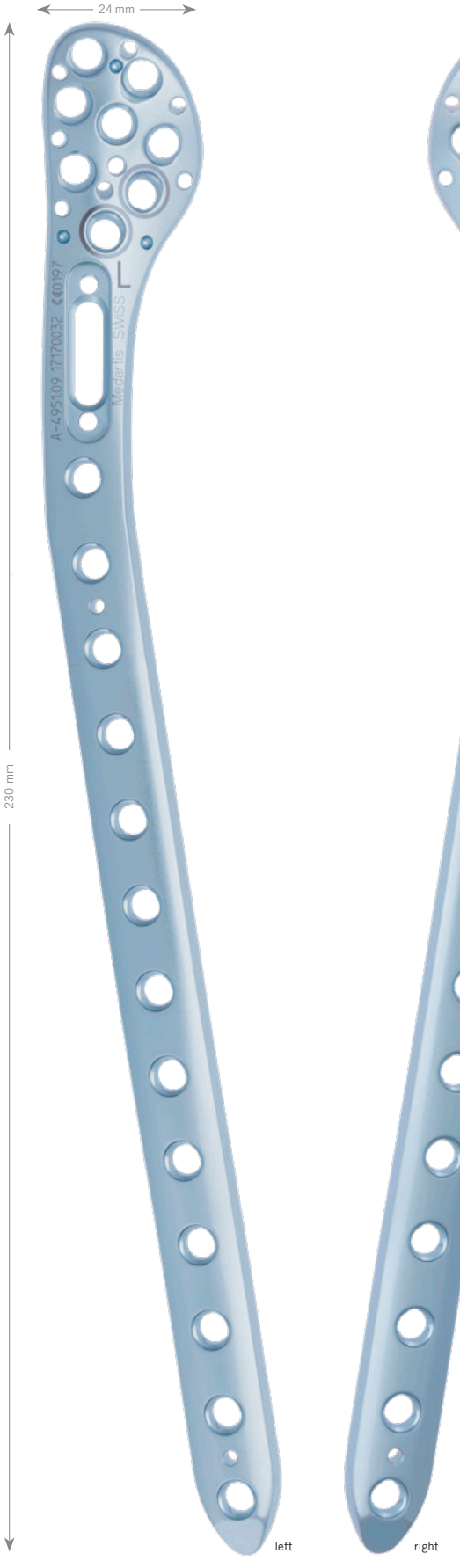
Art. No.	Description	Holes	Pieces/Pkg
A-4951.01	left	3	1
A-4951.02	right	3	1
A-4951.03	left	5	1
A-4951.04	right	5	1
A-4951.05	left	7	1
A-4951.06	right	7	1

3.5 TriLock Proximal Humeral Plates, XL

Material: Titanium (ASTM F67)
Plate thickness 3.0–3.8 mm



A-4951.07 A-4951.08



A-4951.09 A-4951.10

Art. No.	Description	Holes	Pieces/Pkg
A-4951.07	left, XL	10	1
A-4951.08	right, XL	10	1
A-4951.09	left, XL	14	1
A-4951.10	right, XL	14	1

Scale 1:1

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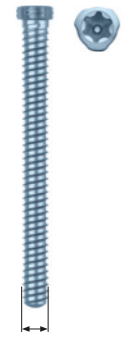
3.5 TriLock Screws, HexaDrive 15

Material: Titanium (ASTM F136)



Length	Art. No.	Pieces/Pkg
16 mm	A-5950.16/1	1
18 mm	A-5950.18/1	1
20 mm	A-5950.20/1	1
22 mm	A-5950.22/1	1
24 mm	A-5950.24/1	1
26 mm	A-5950.26/1	1
28 mm	A-5950.28/1	1
30 mm	A-5950.30/1	1
32 mm	A-5950.32/1	1
34 mm	A-5950.34/1	1
36 mm	A-5950.36/1	1
38 mm	A-5950.38/1	1
40 mm	A-5950.40/1	1
45 mm	A-5950.45/1	1
50 mm	A-5950.50/1	1
55 mm	A-5950.55/1	1
60 mm	A-5950.60/1	1

3.5 Cortical Screws, HexaDrive 15

Material: Titanium (ASTM F136)

Length	Art. No.	Pieces/Pkg
16 mm	A-5900.16/1	1
18 mm	A-5900.18/1	1
20 mm	A-5900.20/1	1
22 mm	A-5900.22/1	1
24 mm	A-5900.24/1	1
26 mm	A-5900.26/1	1
28 mm	A-5900.28/1	1
30 mm	A-5900.30/1	1
32 mm	A-5900.32/1	1
34 mm	A-5900.34/1	1
36 mm	A-5900.36/1	1
38 mm	A-5900.38/1	1
40 mm	A-5900.40/1	1
45 mm	A-5900.45/1	1
50 mm	A-5900.50/1	1
55 mm	A-5900.55/1	1
60 mm	A-5900.60/1	1

Drill Guide Blocks (incl. Screw)

A-2923.01

A-2923.02

Art. No.	Description	Pieces/Pkg
A-2923.01	left	1
A-2923.02	right	1
A-2923.03	screw for drill guide blocks	1

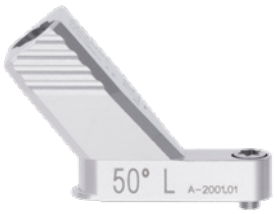
Spiral Cutters for Blades

A-2002.01

A-2002.02

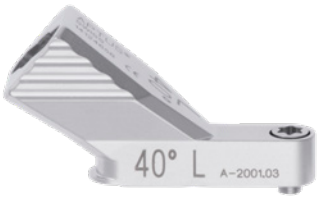
Art. No.	Description	Length	Pieces/Pkg
A-2002.01	left	91 mm	1
A-2002.02	right	91 mm	1

Guides for Spiral Cutters (incl. Screw)



A-2001.01

A-2001.02



A-2001.03

A-2001.04

Art. No.	Description	Pieces/Pkg
A-2001.01	left, 50°	1
A-2001.02	right, 50°	1
A-2001.03	left, 40°	1
A-2001.04	right, 40°	1
A-2001.05	screw for guides for spiral cutters	1

Scale 1:1

→ www.medartis.com/products/aptus/shoulder

K-Wire Guide ∅ 2.0 mm

Art. No.	Description	Length	Pieces/Pkg
A-2000	for K-wire ∅ 2.0 mm	131 mm	1

Drill Guide, Cortex Opening for Blade

Art. No.	Description	Length	Pieces/Pkg
A-2924	for A-3933	132 mm	1

Handle for Spiral Blade

Art. No.	Length	Pieces/Pkg
A-2003	170 mm	1

Twist Drills

A-3931

A-3933

Art. No.	System Size	∅	Stop	Length	Drill Shaft End	Pieces/Pkg
A-3931	3.5	3.0	70 mm	150 mm	AO Quick Coupling	1
A-3933	3.5	3.6 (for gliding hole)	30 mm	126 mm	AO Quick Coupling	1

K-Wires, Stainless Steel

Art. No.	∅	Description	Length	Pieces/Pkg
A-5040.61	2.0 mm	trocar	150 mm	10
A-5042.61	2.0 mm	lancet	150 mm	10

Drill Guide

Art. No.	System Size	Length	Pieces/Pkg
A-2920	3.5	171 mm	1

Drill Sleeve, Self-Holding

Art. No.	System Size	Length	Pieces/Pkg
A-2921	3.5	50 mm	1

Depth Gauge

Art. No.	System Size	Length	Pieces/Pkg
A-2930	3.5/4.0	210 mm	1

Scale 1:1

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Handles with Quick Connector

A-2074 1:2

A-2075 1:2

Art. No.	Description	Length	for Shaft End	Pieces/Pkg
A-2074		145 mm	AO Quick Coupling	1
A-2075	T-Handle	81 mm	AO Quick Coupling	1

Mallet, Slotted

1:2

Art. No.	Length	Pieces/Pkg
A-2004	215 mm	1

Screwdriver Blades, Self-Holding

A-2911 HD15

A-2913.1 HD15

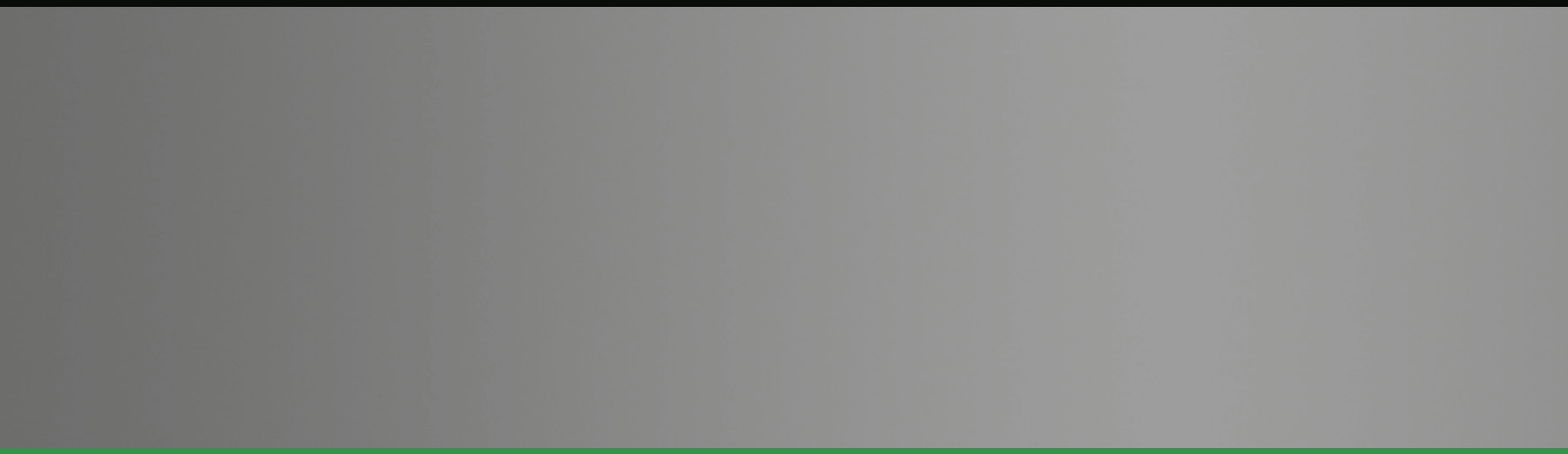
Art. No.	System Size	Description	Length	Shaft End	Pieces/Pkg
A-2911	3.5/4.0	HD15	80 mm	AO Quick Coupling	1
A-2913.1	3.5/4.0	HD15	155 mm	AO Quick Coupling	1

Sleeve for Screwdriver Blade

Art. No.	System Size	Description	Length	Pieces/Pkg
A-2913.2	3.5/4.0	HD15	91 mm	1

Bibliography

1. Beirer M, Crönlein M, Venjakob AJ, Saier T, Schmitt-Sody M, Huber-Wagner S, Biberthaler P, Kirchhoff C:
Additional calcar support using a blade device reduces secondary varus displacement following reconstruction of the proximal humerus: a prospective study.
Eur J Med Res 2015; 20: 82
2. Brunner F, Sommer C, Bahrs C, Heuwinkel R, Hafner C, Rillmann P, Kohut G, Ekelund A, Muller M, Audigé L, Babst R:
Open Reduction and Internal Fixation of Proximal Humerus Fractures Using a Proximal Humeral Locked Plate: A Prospective Multicenter Analysis.
J Orthop Trauma 2009; 23(3): 163-72
3. Court-Brown CM, Caesar B:
Epidemiology of adult fractures: a review.
Injury 2006; 37(8): 691-7
4. Gardner MJ, Weil Y, Barker JU, Kelly BT, Helfet DL, Lorich DG:
The Importance of Medial Support in Locked Plating of Proximal Humerus Fractures.
J Orthop Trauma 2007; 21 (3): 185-91
5. Jost B, Spross C, Grehn H, Gerber C:
Locking plate fixation of fractures of the proximal humerus: analysis of complications, revision strategies and outcome.
J Shoulder Elbow Surg 2013; 22(4): 542-9
6. Jung WB, Moon ES, Kim SK, Kovacevic D, Kim MS:
Does medial support decrease major complications of unstable proximal humerus fractures treated with locking plate?
BMC Musculoskeletal Disorders 2013; 14: 102
7. Königshausen M, Kübler L, Godry H, Citak M, Schildhauer TA, Seybold D:
Clinical outcome and complications using a polyaxial locking plate in the treatment of displaced proximal humerus fractures. A reliable system?
Injury, Int. J. Care Injured 2012; 43(2): 223-31
8. Krappinger D, Bizzotto N, Riedmann S, Kammerlander C, Hengg C, Kralinger FS:
Predicting failure after surgical fixation of proximal humerus fractures.
Injury 2011; 42(11): 1283-8
9. Ockert B, Braunstein V, Kirchhoff C, Körner M, Kirchhoff S, Kehr K, Mutschler W, Biberthaler P:
Monoaxial Versus Polyaxial Screw Insertion in Angular Stable Plate Fixation of Proximal Humeral Fractures: Radiographic Analysis of a Prospective Randomized Study.
J Trauma 2010; 69 (6): 1545-51
10. Osterhoff G, Baumgartner D, Favre P, Wannner GA, Gerber H, Simmen HP, Werner CM:
Medial support by fibula bone graft in angular stable plate fixation of proximal humeral fractures: an in vitro study with synthetic bone.
J Shoulder Elbow Surgery 2011; 20(5): 740-6
11. Owsley KC, Gorczyca JT:
Fracture displacement and screw cutout after open reduction and locked plate fixation of proximal humeral fractures.
J Bone Joint Surg Am. 2008; 90(2): 233-40
12. Plavanen M, Kannus P, Niemi S, Parkkari J:
Update in the epidemiology of proximal humeral fractures.
Clin Orthop Relat Res. 2006; 442: 87-92
13. Sproul RC, Iyengar JJ, Devcic Z, Feeley BT:
A systematic review of locking plate fixation of proximal humerus fractures.
Injury, Int. J. Care Injured 2011; 42(4): 408-13



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