

Humeral distal plates

Medical device description

The plate system consists of the humeral distal extraarticular plate, or in case of the more complicated fractures from two plates - the humeral distal medial and humeral distal dorsolateral.

The plates are made of the steel alloy (according to ISO 5832-1) and the titan alloy (according to ISO 5832-3).

The humeral distal extraarticular plate is used for simple fractures of the lateral part of the distal humerus. The plates are used in combination with the locking screws of the head diameter of 5 mm and with the bone thread diameter of 3.5 or 2.7 mm. These screws can be used at all locking holes. Use the instruments for the angularly stable plates 3.5 mm to introduce these screws. Introduce the standard screws till the diameter of 4 mm into the oval hole.

The humeral distal medial and humeral distal dorsolateral plates are used in combination with the locking screws with the head diameter of 5 mm and the bone thread diameter of 3.5 mm or 2.7 mm in the diaphyseal/proximal part. Use the instruments for the angularly stable plates 3.5 mm to introduce these screws. The locking screws with the head diameter of 3.5 mm and the thread part diameter of 2.7 mm are used in the epiphyseal/distal part. These screws can be used in two versions - with the cortical or cancellous thread. Use the instruments for the angularly stable plates 2.7 mm to introduce these screws. Introduce the standard screws till the diameter of 4 mm into the oval hole.

Indications

The humeral distal extraarticular plate is intended for the A2 and B1 fractures, according to the Müller classification.

The humeral distal medial plate together with the **humeral distal dorsolateral plate** are intended for the A3, B1, B2 and C type fractures according to the Müller classification.



Humeral distal extraarticular plate, right



Humeral distal extraarticular plate, left



Humeral distal medial plate, right



Humeral distal medial plate, left



The humeral distal dorsolateral plate, right



The humeral distal dorsolateral plate, left



Self-tapping cortical locking screw 2.7



Self-tapping cancellous locking screw 2.7



Bone locking screw 3.5



Bone locking screw 3.5/2.7



Self-tapping bone locking screw HA 3.5

This brochure serves only as an illustrative guide for the distal humeral plate and instrument set. The aim of the brochure is to provide to the doctors and theatre nurses a quick orientation, a correct composition, a use of the instrumentation and the implant so as to achieve the best result of the procedure. If you have any questions, please contact a sales representative of the MEDIN company.

Surgical technique

1. The patient's position

The patient is laying in the prone position (Fig. 1) or in the position on the side with the supported elbow (Fig. 2). The patient position has to allow the C arm access in two perpendicular projections to check the reposition and stabilisation.

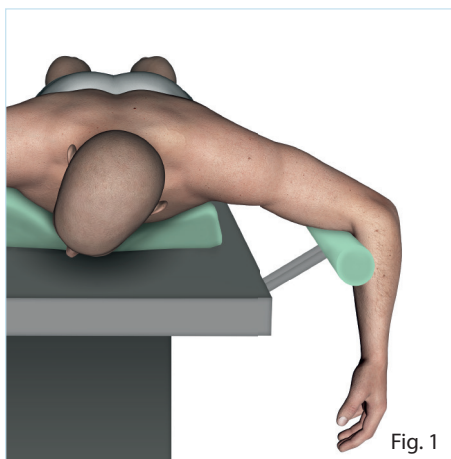


Fig. 1

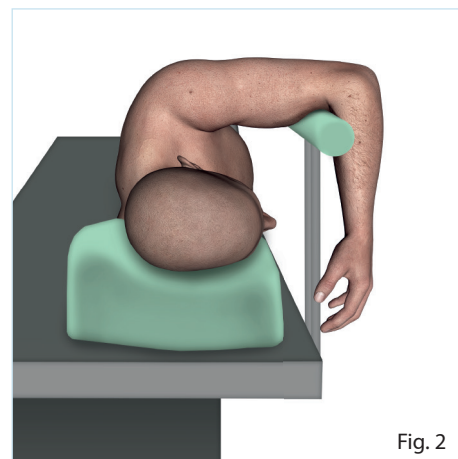


Fig. 2

2. Surgical access

The standard access is from the dorsal side using the longitudinal incision over the distal portion of the *m. triceps* with the curve slightly radially around the olecranon onto the proximal ulna (Fig. 3) and it is performed a potential Chevron osteotomy. It is important to identify and secure the ulnar nerve to avoid its damage. The incision cuts away only *m. anconeus* and circle around ulnar olecranon when planned usage only the extra-articular plate.

Chevron osteotomy of the olecranon – arrow like osteotomy of the olecranon is performed for a better visualisation and the fracture reposition (Fig. 4). Perform this osteotomy when the fracture is not well visible or if you are not able to perform a correct reposition of the fracture.

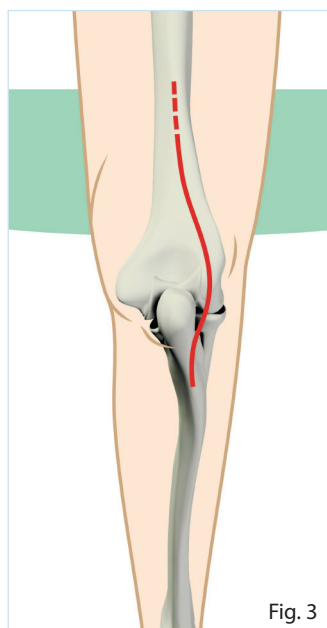


Fig. 3

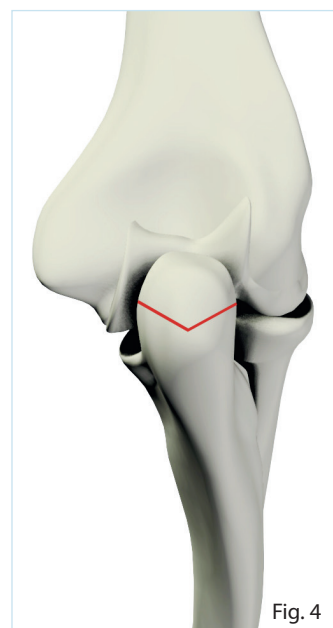


Fig. 4

3. Fracture reposition and stabilisation

Perform reposition on the condyle using a bone hook or a bone forceps and temporarily stabilize an intraarticular fracture using Kirschner wires after the revision of the fracture. The temporary stabilisation is completed or changed for a stable osteosynthesis of the condyle using the transversally introduced traction screws or the traction cannulated screws after the X-ray check. Place these potential screws distally from the *fossa olecrani* so that they do not interfere with the elbow and do not irritate the ulnar or the radial nerve.

This stabilisation step is skipped in the case of the more simple fracture and usage of the **extraarticular** plate. Perform there directly a condyle reposition with the fixation to metaphysis. The stabilisation is temporary using the transversally introduced wires through the epiphysis and metaphysis with the anchoring in the opposite diaphysis (Fig. 5). Place the anatomical plates after the X-ray check and the evaluation of the temporary reposition.

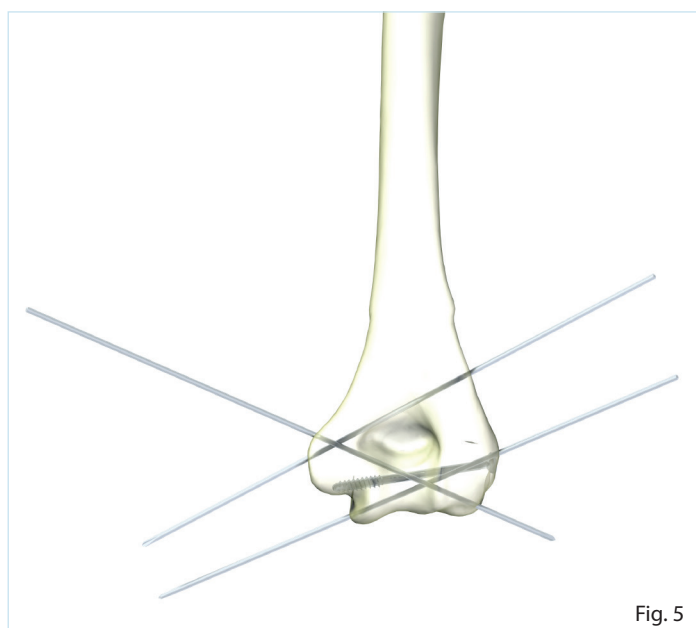


Fig. 5

4. Osteosynthesis

Place the **dorsolateral** plate first onto the radial part of the condyle, which finishes in the area of the capitulum of the humerus. The end of the plate is adjacent to the dorsal corticalis and it must not interfere with the movement of the radius head at the full extension and with the movement of the olecranon to the *fossa olecrani* at the extension.

The anatomical plates correspond to the majority of our population (Figs. 6 and 7). When placing them onto the bone surface, try to put them the way that they copy the bone surface as good as possible. Shape the plates using the bone pliers in the exceptional cases. The plate can deform the thread in the angularly stable hole when shaping and subsequently it will not be possible to secure the locking screw in it!

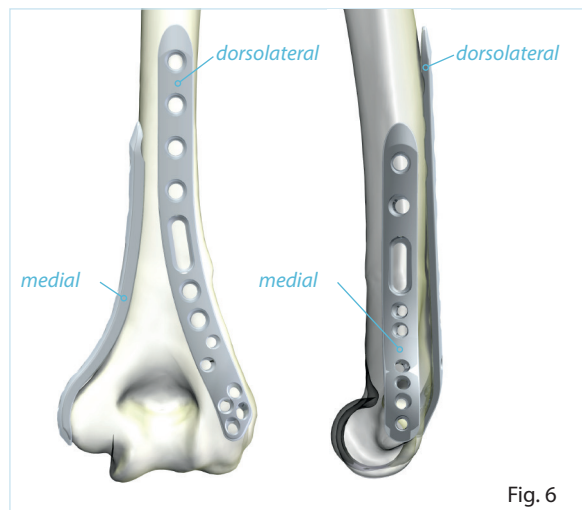


Fig. 6

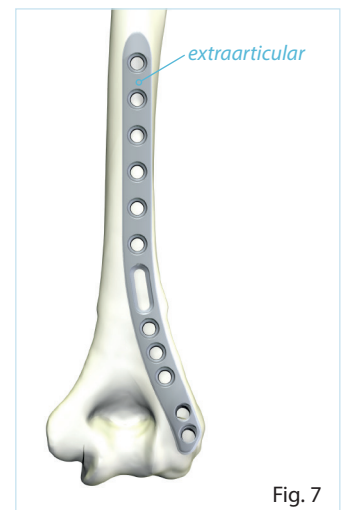


Fig. 7

Temporarily fix the plate to the bone in the oval groove using the cortical screw and K-wires (Fig. 8–10). Check the positioning in both projections using X-ray.

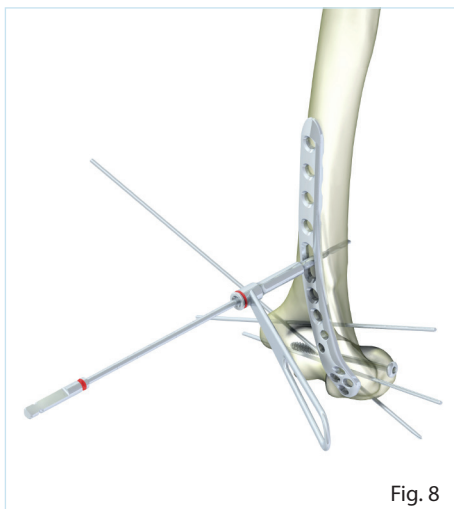


Fig. 8

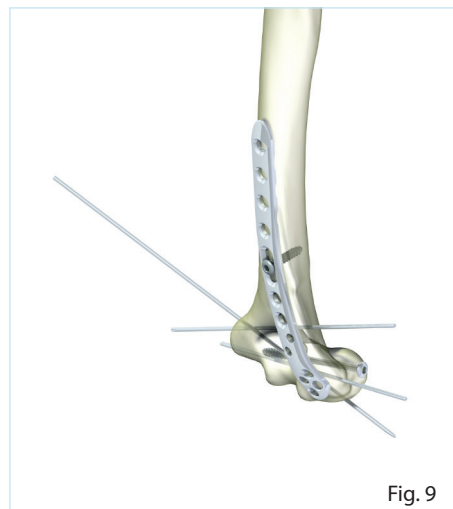


Fig. 9

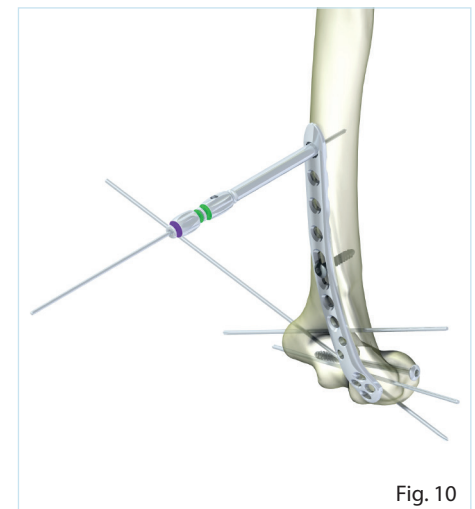


Fig. 10

Fix step by step proximal and distal fragments using the locking screws (Fig. 11–13). Fix using screws of $\varnothing 2.7$ mm with the pre-drill of $\varnothing 2$ mm in the area of capitulum. Introduce the screws into the subchondral bone only.

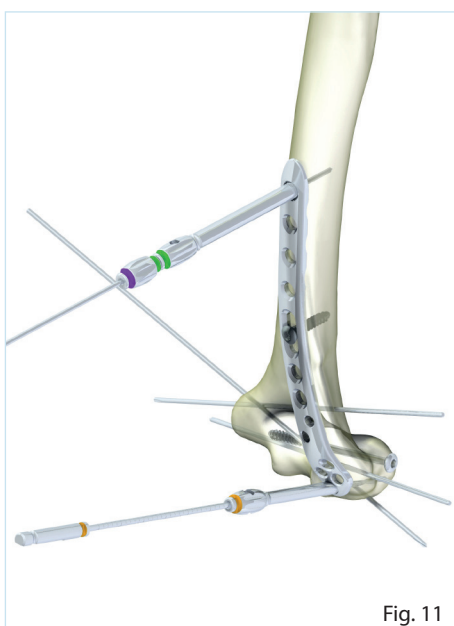


Fig. 11

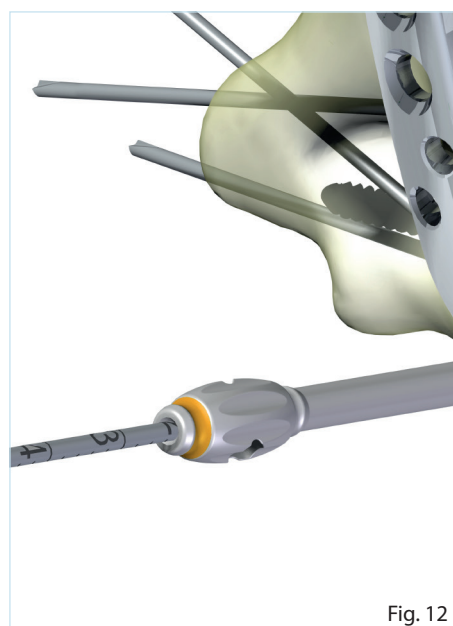


Fig. 12

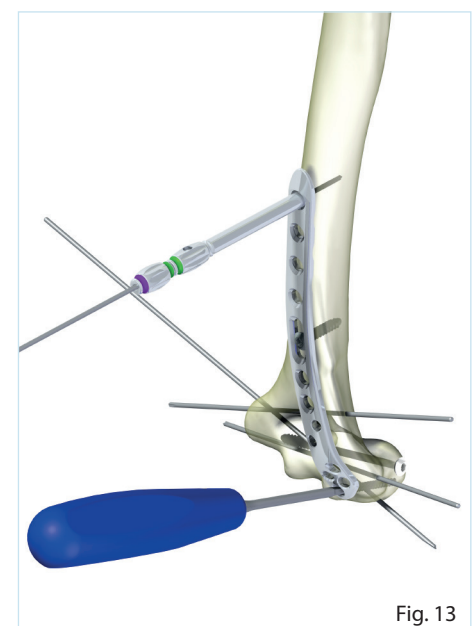


Fig. 13

HUMERAL DISTAL PLATES

Introduce the locking screws of \varnothing 3.5 mm and pre-drill with the drill of \varnothing 2.9 mm bicortically in the area of diaphysis and metaphysis (Fig. 14).

Measure the length of all screws using the drill scale or the sliding gauge and check continuously.

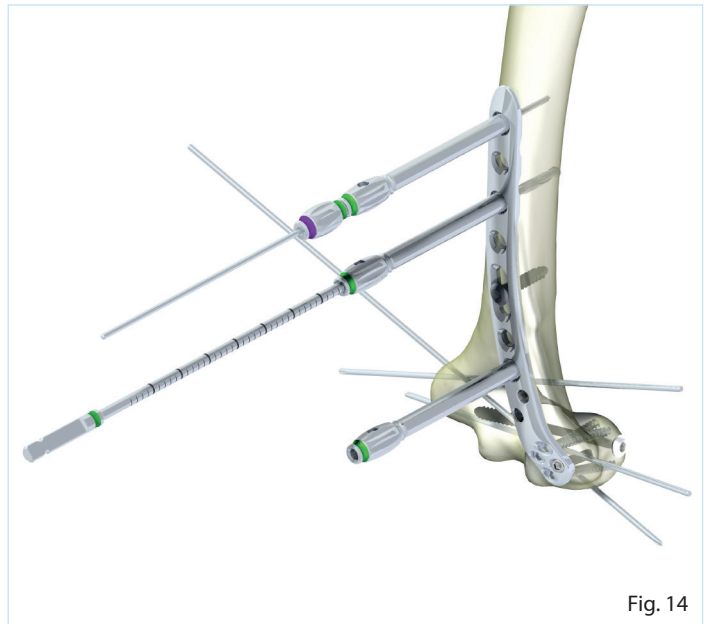


Fig. 14

Remove step by step the useless Kirschner wires after the fixation of the first plate. Carefully protect the ulnar nerve and put the **medial** plate cranially from the ulnar epicondyle. The medial plate outlines the medial bone surface and its cranial end finishes more caudally than the cranial end of the dorsolateral plate. Secure the positioning of the plate using the K-wires and check it by X-ray. Fasten the plate to the bone using the cortical screw. If you do not want to damage the blood supply of the bone, do not fasten the screw in the groove. Introduce the screws similarly as at the dorsolateral plate. Fix step by step the proximal and distal fragment. The screws into the epiphysis area are only the monocortical locking screws of \varnothing 2.7 mm (Fig. 15). Watch a possible collision of the drill with the wires and screws when drilling. The distal screws must not reach the elbow joint and the area of the *fossa olecrani*. The metaphyseal and diaphyseal screws are locking of \varnothing 3.5 mm or 2.7 mm. Skip the application of the screw or substitute it by the slightly deviated cortical screw if there is an earlier introduced screw from the dorsal plate in the direction of the locking screw.

Check the fracture stability and the range of movement using x-ray. Visually monitor the position of the ulnar nerve at the movement and, if necessary, release it, secure or move.

The number of the screws in the plate depends on the type of the fracture and the bone quality. There are necessary at least three screws in the plate in the proximal fragment. Introduce the screws in the distal fragment according to the nature of the fracture so that they fix and stabilize the fracture fragments. Introduce the screws monocortically. They protect the plate to be torn from the bone and possibly the fragment loosening by its divergent direction.

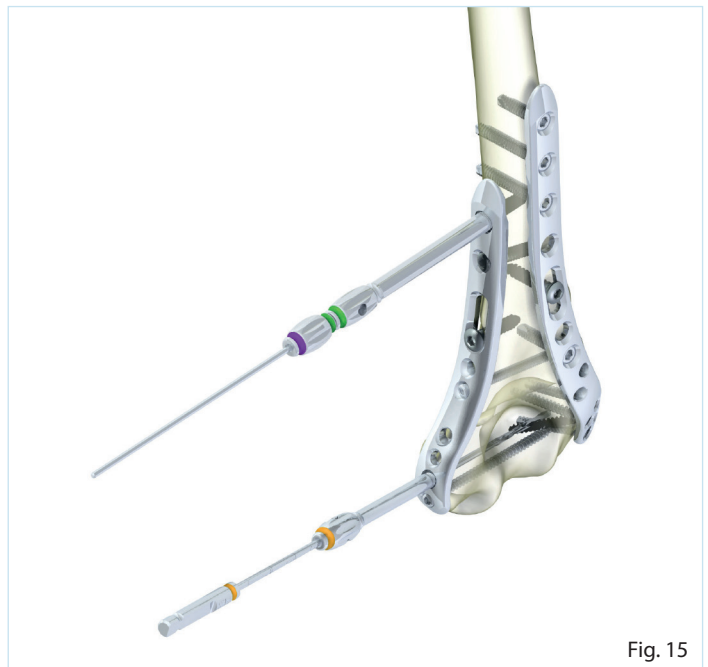


Fig. 15

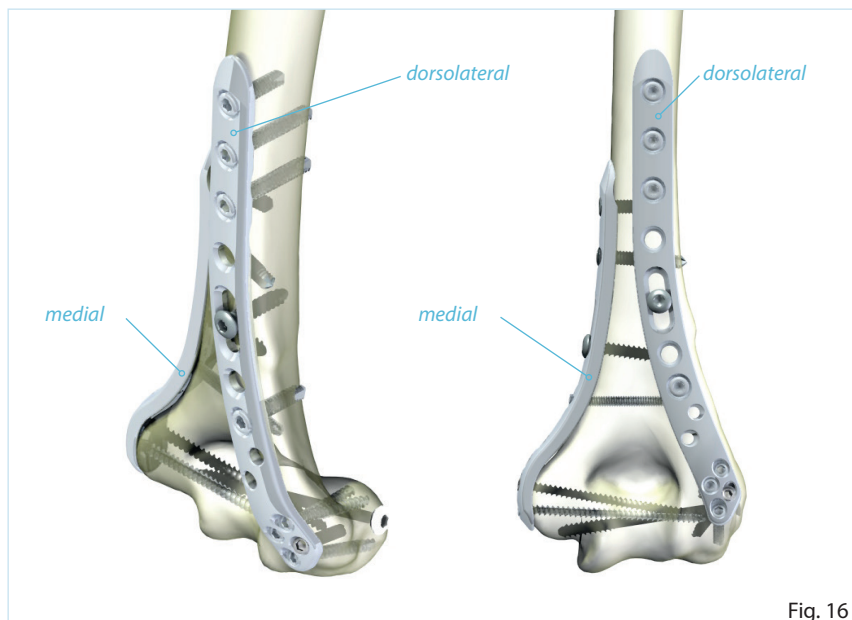


Fig. 16

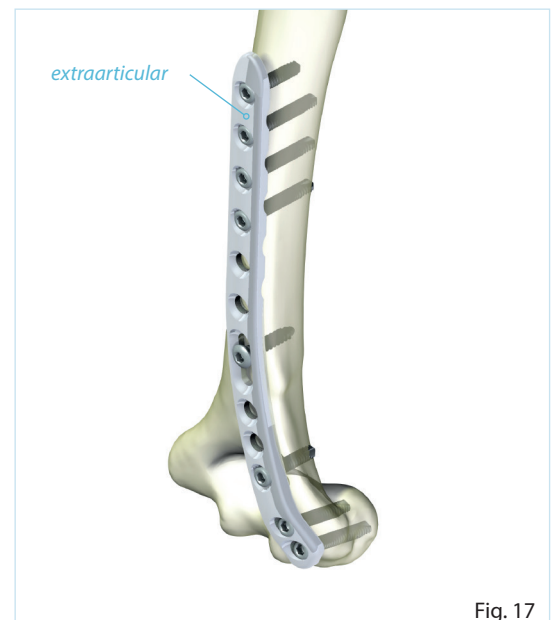
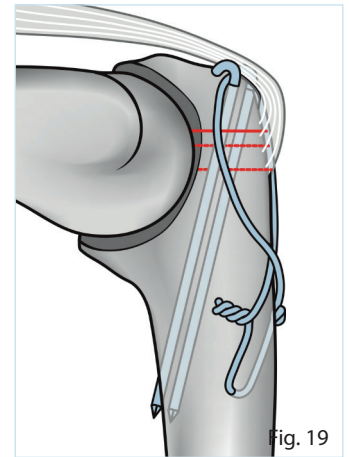
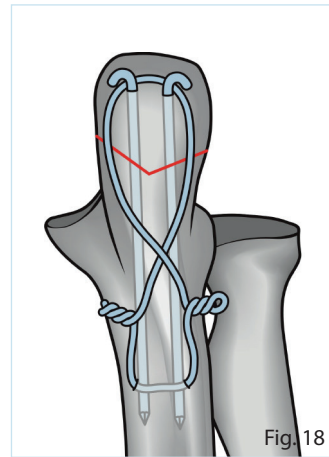


Fig. 17

Drain the fracture, saturate *m. triceps* and fix *m. anconeus* back to the olecranon.

Perform the reposition of the ulnar olecranon and stabilise using the traction cerclage or the ulnar proximal plate (Figs. 18-19) when performing the Chevron osteotomy.

Saturate the wound in layers and attach a dorsal plaster splint that will ensure the rest and the soft tissue healing. We avoid the rigid fixation and fix only with the elevation sling or immobilizer in the case of the stable osteosynthesis and the cooperating patient.



5. Postoperative care

We start a rehabilitation on the first day according to the instructions of the surgeon. The implants are not designed as bearing, so the burden should not begin until after the formation of callus.

6. Removal of the implants

The metal material leave permanently as planned, remove only at the difficulties or at the special indications. When removing loosen all screws first and then screw them out. Then remove the plate or plates.

Final notes

Never combine different materials in one patient.

It is required to use only the implants of the MEDIN company to guarantee the safe usage on the implant.

Implants from different companies must never be combined.

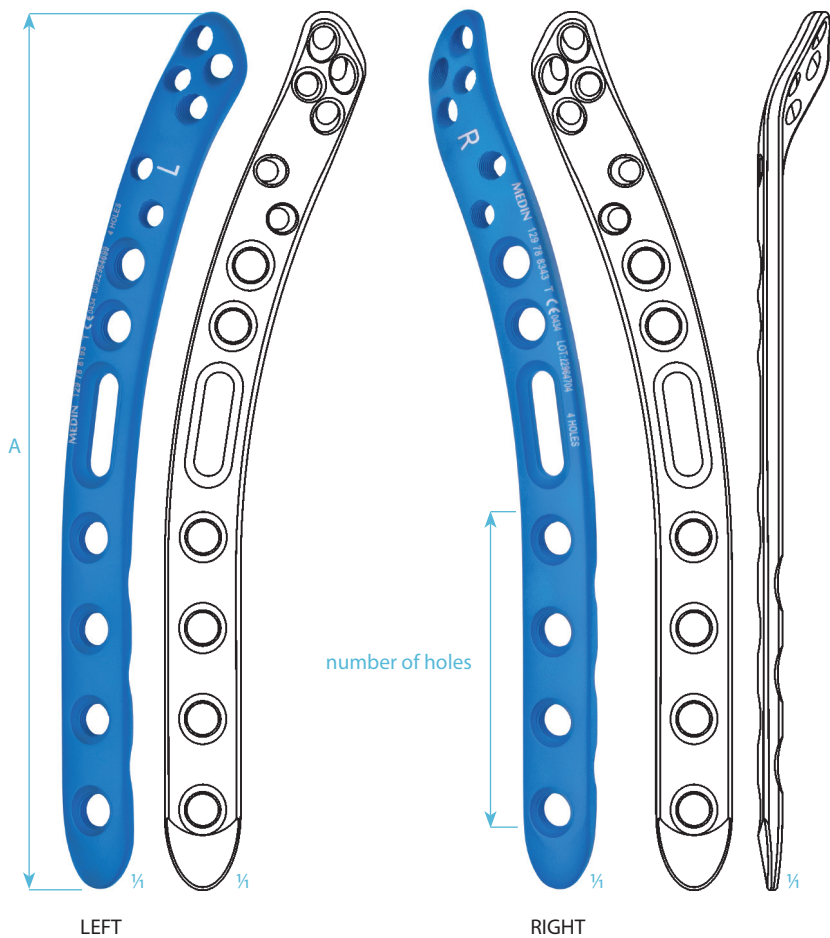
The patient must be warned that the implant does not replace a healthy limb. Implant, respectively fracture must be burdened step by step, depending on the callus formation at the fracture site.

The implants are intended for single use, single patient and single bone stabilization only. Repeated use is forbidden. This fact is stated in the product leaflet and is valid for all implants.



HUMERAL DISTAL PLATES

HUMERAL DISTAL DORSOLATERAL PLATES



The humeral distal dorsolateral plate, left

SSt	Ti	A	number of
129 78 8170	129 78 8173	92 mm	2
129 78 8190	129 78 8193	116 mm	4
129 78 8210	129 78 8213	140 mm	6
129 78 8230	129 78 8233	164 mm	8
129 78 8250	129 78 8253	188 mm	10

at special order

129 78 8150	129 78 8153	68 mm	0
129 78 8160	129 78 8163	80 mm	1
129 78 8180	129 78 8183	104 mm	3
129 78 8200	129 78 8203	128 mm	5
129 78 8220	129 78 8223	152 mm	7
129 78 8240	129 78 8243	176 mm	9
129 78 8260	129 78 8263	200 mm	11
129 78 8270	129 78 8273	212 mm	12

The humeral distal dorsolateral plate, right

SSt	Ti	A	number of
129 78 8320	129 78 8323	92 mm	2
129 78 8340	129 78 8343	116 mm	4
129 78 8360	129 78 8363	140 mm	6
129 78 8380	129 78 8383	164 mm	8
129 78 8400	129 78 8403	188 mm	10

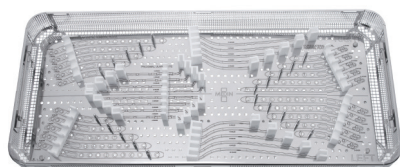
at special order

129 78 8300	129 78 8303	68 mm	0
129 78 8310	129 78 8313	80 mm	1
129 78 8330	129 78 8333	104 mm	3
129 78 8350	129 78 8353	128 mm	5
129 78 8370	129 78 8373	152 mm	7
129 78 8390	129 78 8393	176 mm	9
129 78 8410	129 78 8413	200 mm	11
129 78 8420	129 78 8423	212 mm	12

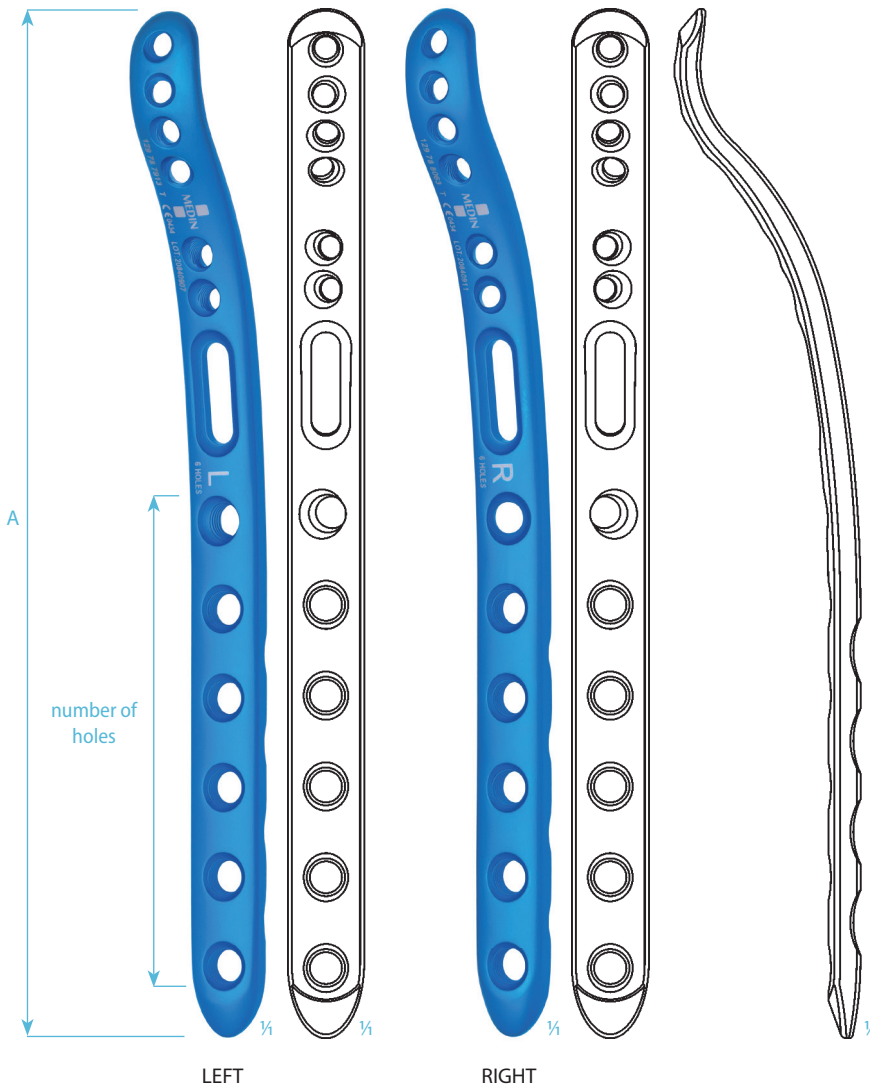
plate depth 2.5 mm

SCREWS:

locking bone screws 3.5 a 3.5/2.7 mm
locking cortical screws 2.7 mm
locking cancellous screws 2.7 mm
cortical screw HA 3.5



129 69 8380 Sieve for humeral distal and ulnar proximal plates
540 × 240 × 50 mm
without implants



Humeral distal medial plate, left

SSt	Ti	A	number of
129 78 7870	129 78 7873	89 mm	2
129 78 7890	129 78 7893	113 mm	4
129 78 7910	129 78 7913	137 mm	6
129 78 7930	129 78 7933	161 mm	8
129 78 7950	129 78 7953	185 mm	10

at special order

129 78 7850	129 78 7853	66 mm	0
129 78 7860	129 78 7863	77 mm	1
129 78 7880	129 78 7883	101 mm	3
129 78 7900	129 78 7903	125 mm	5
129 78 7920	129 78 7923	149 mm	7
129 78 7940	129 78 7943	173 mm	9
129 78 7960	129 78 7963	197 mm	11
129 78 7970	129 78 7973	209 mm	12

Humeral distal medial plate, right

SSt	Ti	A	number of
129 78 8020	129 78 8023	89 mm	2
129 78 8040	129 78 8043	113 mm	4
129 78 8060	129 78 8063	137 mm	6
129 78 8080	129 78 8083	161 mm	8
129 78 8100	129 78 8103	185 mm	10

at special order

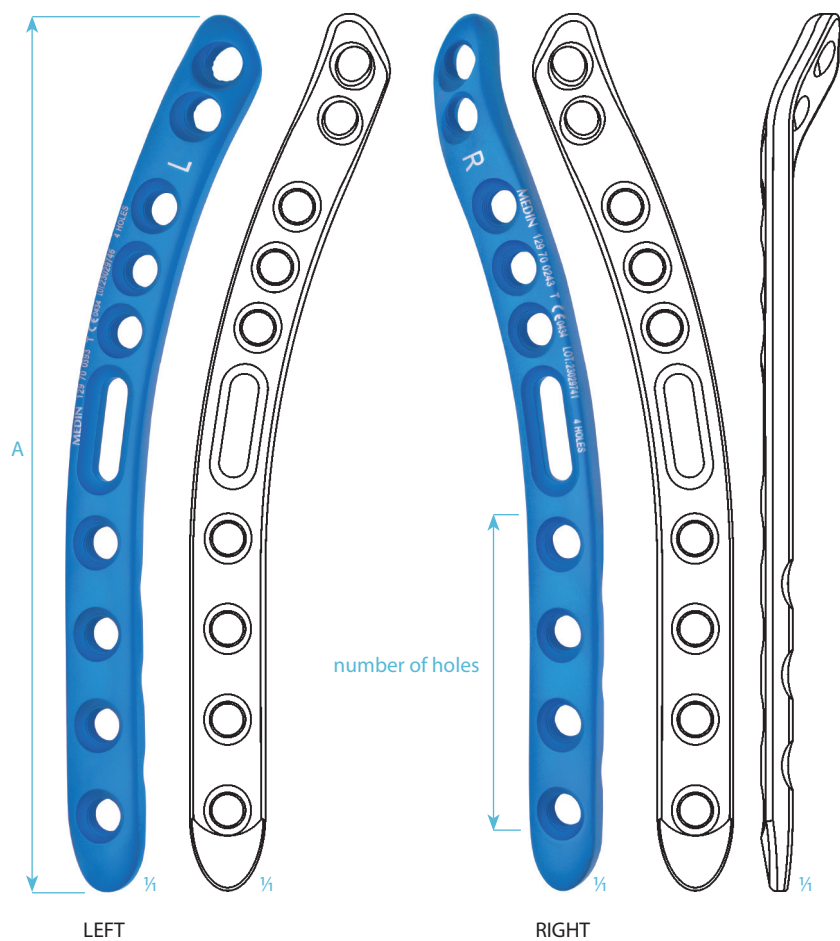
129 78 8000	129 78 8003	66 mm	0
129 78 8010	129 78 8013	77 mm	1
129 78 8030	129 78 8033	101 mm	3
129 78 8050	129 78 8053	125 mm	5
129 78 8070	129 78 8073	149 mm	7
129 78 8090	129 78 8093	173 mm	9
129 78 8110	129 78 8113	197 mm	11
129 78 8120	129 78 8123	209 mm	12

plate depth 3.2 mm

SCREWS:
 locking bone screws 3.5 a 3.5/2.7 mm
 locking cortical screws 2.7 mm
 locking cancellous screws 2.7 mm
 cortical screws HA 3.5

HUMERAL DISTAL PLATES

HUMERAL DISTAL EXTRAARTICULAR PLATES



Humeral distal extraarticular plate, left

SSt	Ti	A	number of
129 70 0370	129 70 0373	92 mm	2
129 70 0390	129 70 0393	116 mm	4
129 70 0410	129 70 0413	140 mm	6
129 70 0430	129 70 0433	164 mm	8
129 70 0450	129 70 0453	188 mm	10

at special order

129 70 0350	129 70 0353	68 mm	0
129 70 0360	129 70 0363	80 mm	1
129 70 0380	129 70 0383	104 mm	3
129 70 0400	129 70 0403	128 mm	5
129 70 0420	129 70 0423	152 mm	7
129 70 0440	129 70 0443	176 mm	9
129 70 0460	129 70 0463	200 mm	11
129 70 0470	129 70 0473	212 mm	12

Humeral distal extraarticular plate, right

SSt	Ti	A	number of
129 70 0220	129 70 0223	92 mm	2
129 70 0240	129 70 0243	116 mm	4
129 70 0260	129 70 0263	140 mm	6
129 70 0280	129 70 0283	164 mm	8
129 70 0300	129 70 0303	188 mm	10

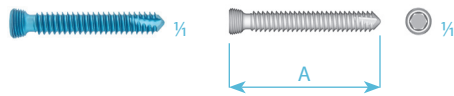
at special order

129 70 0200	129 70 0203	68 mm	0
129 70 0210	129 70 0213	80 mm	1
129 70 0230	129 70 0233	104 mm	3
129 70 0250	129 70 0253	128 mm	5
129 70 0270	129 70 0273	152 mm	7
129 70 0290	129 70 0293	176 mm	9
129 70 0310	129 70 0313	200 mm	11
129 70 0320	129 70 0323	212 mm	12

plate depth 3.5 mm

SCREWS:

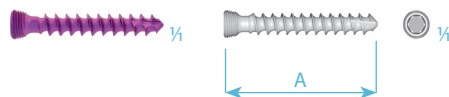
locking bone screws 3.5 and 3.5/2.7 mm
cortical screws HA 3.5



thread diameter	2.7 mm
core diameter	2.0 mm
head diameter	3.5 mm
drill for the thread	Ø 2.0 mm
screwdriver	Ø 2.0 mm

Self-tapping cortical locking screw 2.7

SSt	Ti	A
129 70 1901	129 70 1904	6 mm
129 70 1911	129 70 1914	8 mm
129 70 1921	129 70 1924	10 mm
129 70 1931	129 70 1934	12 mm
129 70 1941	129 70 1944	14 mm
129 70 1951	129 70 1954	16 mm
129 70 1961	129 70 1964	18 mm
129 70 1971	129 70 1974	20 mm
129 70 1981	129 70 1984	22 mm
129 70 1991	129 70 1994	24 mm
129 70 2001	129 70 2004	26 mm
129 70 2011	129 70 2014	28 mm
129 70 2021	129 70 2024	30 mm
129 70 2031	129 70 2034	32 mm
129 70 2041	129 70 2044	34 mm
129 70 2051	129 70 2054	36 mm
129 70 2061	129 70 2064	38 mm
129 70 2071	129 70 2074	40 mm
129 70 2081	129 70 2084	42 mm
129 70 2091	129 70 2094	44 mm
129 70 2101	129 70 2104	46 mm
129 70 2111	129 70 2114	48 mm
129 70 2121	129 70 2124	50 mm
129 70 2131	129 70 2134	55 mm
129 70 2141	129 70 2144	60 mm
129 70 2151	129 70 2154	65 mm
129 70 2161	129 70 2164	70 mm
129 70 2171	129 70 2174	75 mm
129 70 2181	129 70 2184	80 mm



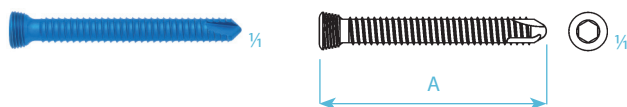
diameter of the thread	2.7 mm
diameter of the core	1.6 mm
diameter of the head	3.5 mm
drill for the thread	Ø 1.8 mm
screwdriver	Ø 2.0 mm

Self-tapping cancellous locking screw 2.7

SSt	Ti	A
129 70 2201	129 70 2204	6 mm
129 70 2211	129 70 2214	8 mm
129 70 2221	129 70 2224	10 mm
129 70 2231	129 70 2234	12 mm
129 70 2241	129 70 2244	14 mm
129 70 2251	129 70 2254	16 mm
129 70 2261	129 70 2264	18 mm
129 70 2271	129 70 2274	20 mm
129 70 2281	129 70 2284	22 mm
129 70 2291	129 70 2294	24 mm
129 70 2301	129 70 2304	26 mm
129 70 2311	129 70 2314	28 mm
129 70 2321	129 70 2324	30 mm
129 70 2331	129 70 2334	32 mm
129 70 2341	129 70 2344	34 mm
129 70 2351	129 70 2354	36 mm
129 70 2361	129 70 2364	38 mm
129 70 2371	129 70 2374	40 mm
129 70 2381	129 70 2384	42 mm
129 70 2391	129 70 2394	44 mm
129 70 2401	129 70 2404	46 mm
129 70 2411	129 70 2414	48 mm
129 70 2421	129 70 2424	50 mm
129 70 2431	129 70 2434	55 mm
129 70 2441	129 70 2444	60 mm
129 70 2451	129 70 2454	65 mm
129 70 2461	129 70 2464	70 mm
129 70 2471	129 70 2474	75 mm
129 70 2481	129 70 2484	80 mm

HUMERAL DISTAL PLATES

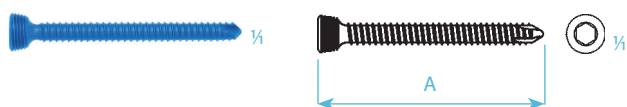
BONE LOCKING SCREWS 3.5



diameter of the thread	3.5 mm
diameter of the core	3.0 mm
diameter of the head	5.0 mm
drill for the thread	Ø 2.9 mm
screwdriver	Ø 2.5 mm

Bone locking screw 3.5

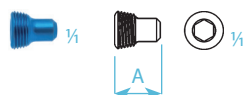
SSt	Ti	A
129 77 7021	129 77 7024	8 mm
129 77 7031	129 77 7034	10 mm
129 77 7041	129 77 7044	12 mm
129 77 7051	129 77 7054	14 mm
129 77 7061	129 77 7064	16 mm
129 77 7071	129 77 7074	18 mm
129 77 7081	129 77 7084	20 mm
129 77 7091	129 77 7094	22 mm
129 77 7101	129 77 7104	24 mm
129 77 7111	129 77 7114	26 mm
129 77 7121	129 77 7124	28 mm
129 77 7131	129 77 7134	30 mm
129 77 7141	129 77 7144	32 mm
129 77 7151	129 77 7154	34 mm
129 77 7161	129 77 7164	36 mm
129 77 7171	129 77 7174	38 mm
129 77 7181	129 77 7184	40 mm
129 77 7191	129 77 7194	42 mm
129 77 7201	129 77 7204	44 mm
129 77 7211	129 77 7214	46 mm
129 77 7221	129 77 7224	48 mm
129 77 7231	129 77 7234	50 mm
129 77 7241	129 77 7244	55 mm
129 77 7251	129 77 7254	60 mm
129 77 7261	129 77 7264	65 mm
129 77 7271	129 77 7274	70 mm
129 77 7281	129 77 7284	75 mm



diameter of the thread	2.7 mm
diameter of the core	2.2 mm
diameter of the head	5.0 mm
drill for the thread	Ø 2.0 mm
screwdriver	Ø 2.5 mm

Bone locking screw 3.5/2.7

SSt	Ti	A
129 77 7431	129 77 7434	10 mm
129 77 7441	129 77 7444	12 mm
129 77 7451	129 77 7454	14 mm
129 77 7461	129 77 7464	16 mm
129 77 7471	129 77 7474	18 mm
129 77 7481	129 77 7484	20 mm
129 77 7491	129 77 7494	22 mm
129 77 7501	129 77 7504	24 mm
129 77 7511	129 77 7514	26 mm
129 77 7521	129 77 7524	28 mm
129 77 7531	129 77 7534	30 mm
129 77 7541	129 77 7544	32 mm
129 77 7551	129 77 7554	34 mm
129 77 7561	129 77 7564	36 mm
129 77 7571	129 77 7574	38 mm
129 77 7921	129 77 7924	40 mm
129 77 7931	129 77 7934	42 mm
129 77 7941	129 77 7944	44 mm
129 77 7951	129 77 7954	46 mm
129 77 7961	129 77 7964	48 mm
129 77 7971	129 77 7974	50 mm



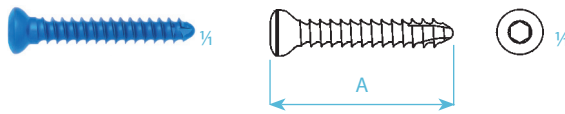
diameter of the head	5.0 mm
driver	Ø 2.5 mm

Locking spacer

SSt	Ti	A
129 77 7420	129 77 7423	6 mm



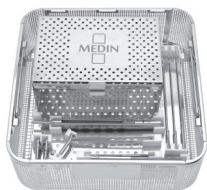
129 79 9960 Stand for the locking screws 3.5
225 × 161 × 86 mm
without implants



thread diameter	3.5 mm
core diameter	2.4 mm
head diameter	6.0 mm
drill for the thread	Ø 2.7 mm
drill for the sliding hole	Ø 3.6 mm
screwdriver	Ø 2.5 mm

Self-tapping bone locking screw HA 3.5

SSt	Ti	A
129 79 5201	129 79 5204	8 mm
129 79 5211	129 79 5214	10 mm
129 79 5221	129 79 5224	12 mm
129 79 5231	129 79 5234	14 mm
129 79 5241	129 79 5244	16 mm
129 79 5251	129 79 5254	18 mm
129 79 5261	129 79 5264	20 mm
129 79 5271	129 79 5274	22 mm
129 79 5281	129 79 5284	24 mm
129 79 5291	129 79 5294	26 mm
129 79 5301	129 79 5304	28 mm
129 79 5311	129 79 5314	30 mm
129 79 5321	129 79 5324	32 mm
129 79 5331	129 79 5334	34 mm
129 79 5341	129 79 5344	36 mm
129 79 5351	129 79 5354	38 mm
129 79 5361	129 79 5364	40 mm
129 79 5371	129 79 5374	42 mm
129 79 5441	129 79 5444	44 mm
129 79 5451	129 79 5454	46 mm
129 79 5461	129 79 5464	48 mm
129 79 5391	129 79 5394	50 mm
129 79 5401	129 79 5404	55 mm
129 79 5411	129 79 5414	60 mm
129 79 5421	129 79 5424	65 mm
129 79 5431	129 79 5434	70 mm



139 09 0675 Instrument set of the angularly stable plates with the screws 2.7 mm
240 × 240 × 90 mm
instruments included



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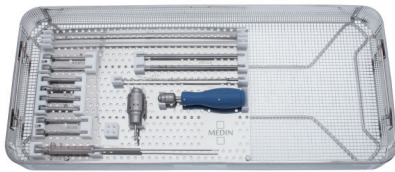
10

139 09 0670	set		pcs
1	129 69 8320	Stand for the locking screws 2.7	1
2	129 69 7675	Depth gauge	1
3	129 69 7470	Screwdriver; 6HR 2 mm; 140 mm	1
4	129 69 7910	Bit 6HR 2 mm	1
5	129 69 8341	Drill Ø2.5 × 165 mm	1
6	129 69 8110	Drill Ø2.0 × 165 mm	1
7	129 69 8100	Drill Ø1.8 × 165 mm	1
8	129 69 6710	Locking guide sleeve Ø2 mm	2
9	129 69 9800	Locking guide sleeve Ø1.8 mm	2
10	129 69 8330	Guide sleeve Ø2 mm	1



129 69 8370 Sieve for the instruments for the angularly stable plates 2.7
240 × 240 × 90 mm
excluding instruments

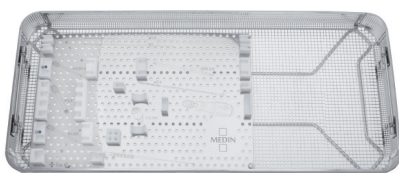
INSTRUMENT SET FOR THE ANGULARLY STABLE PLATES WITH SCREWS 3.5



139 09 0255 Instrument set of the angularly stable plates with the screws 3.5 mm
540 × 240 × 50 mm
instruments included



139 09 0250	set		pcs
1	129 09 2550	MEDIN K-wire 1.5 mm; 300 mm	3
2	129 09 2570	MEDIN K-wire 2.0 mm; 300 mm	3
3	129 69 3360	Locking guide sleeve 2.9 mm; 60 mm	4
4	129 69 3370	Guide sleeve for wires 1.5 mm; 75 mm	2
5	129 69 4360	Guide sleeve for wires 2.0 mm; 75 mm	2
6	129 69 4780	Depth gauge	1
7	129 69 5131	Holder	1
8	129 69 5126	Torque clutch 1.5 Nm	1
9	129 69 5231	Screwdriver; hexagon 2.5 mm; 160 mm	2
10	129 79 9981	Drill Ø2.9 mm; 190 mm	1



129 69 4390 Sieve for the instruments for the angularly stable plates 3.5
540 × 240 × 50 mm
excluding instruments

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