

Proximal Humerus Plate Procedure Steps



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Surgical Techniques

Abay Proximal Humerus Plate

The Plate

The main features of the Abay Proximal Humerus Plate:

- Anatomically shaped
- Low profile plate:
- Circumference radiopaque marking outlining the plate contour for positioning & follow-up
- Compatible plate shaft Screw Holes for locking or non-locking screws
- Similar instrumentation & procedure steps as conventional metal plates

Reference	Description	Holes	Length-Right/Left	Barcode
0301-03101	Proximal Humeral Anatomic Plate	3 Holes	101 mm - Left	8683109330091
0301-05131	Proximal Humeral Anatomic Plate	5 Holes	131 mm - Left	8683109330107
0302-03101	Proximal Humeral Anatomic Plate	3 Holes	101 mm - Right	8683109330114
0302-05131	Proximal Humeral Anatomic Plate	5 Holes	131 mm - Right	8683109330121









The Screws

Locking Cansellouse Screw

Reference	Description	Diameter	Length	Barcode
0301-034004	Locking Cansellouse Screw	4.0 mm	4 mm	8683109330554
0301-034016	Locking Cansellouse Screw	4.0 mm	16 mm	8683109330229
0301-034018	Locking Cansellouse Screw	4.0 mm	18 mm	8683109330230
0301-034020	Locking Cansellouse Screw	4.0 mm	20 mm	8683109330231
0301-034022	Locking Cansellouse Screw	4.0 mm	22 mm	8683109330232
0301-034024	Locking Cansellouse Screw	4.0 mm	24 mm	8683109330233
0301-034026	Locking Cansellouse Screw	4.0 mm	26 mm	8683109330234
0301-034028	Locking Cansellouse Screw	4.0 mm	28 mm	8683109330235
0301-034030	Locking Cansellouse Screw	4.0 mm	30 mm	8683109330236
0301-034032	Locking Cansellouse Screw	4.0 mm	32 mm	8683109330237
0301-034034	Locking Cansellouse Screw	4.0 mm	34 mm	8683109330238
0301-034036	Locking Cansellouse Screw	4.0 mm	36 mm	8683109330239
0301-034038	Locking Cansellouse Screw	4.0 mm	38 mm	8683109330240
0301-034040	Locking Cansellouse Screw	4.0 mm	40 mm	8683109330241
0301-034042	Locking Cansellouse Screw	4.0 mm	42 mm	8683109330242
0301-034044	Locking Cansellouse Screw	4.0 mm	44 mm	8683109330243
0301-034046	Locking Cansellouse Screw	4.0 mm	46 mm	8683109330244
0301-034048	Locking Cansellouse Screw	4.0 mm	48 mm	8683109330245
0301-034050	Locking Cansellouse Screw	4.0 mm	50 mm	8683109330246









0301-034028



0301-034004

Locking Cortical Screws

Reference	Description	Diameter	Length	Barcode
0301-033504	Locking Cortical Screw	3.5 mm	4 mm	8683109330555
0301-033520	Locking Cortical Screw	3.5 mm	20 mm	8683109330263
0301-033522	Locking Cortical Screw	3.5 mm	22 mm	8683109330264
0301-033524	Locking Cortical Screw	3.5 mm	24 mm	8683109330265
0301-033526	Locking Cortical Screw	3.5 mm	26 mm	8683109330266
0301-033528	Locking Cortical Screw	3.5 mm	28 mm	8683109330267
0301-033530	Locking Cortical Screw	3.5 mm	30 mm	8683109330268
0301-033532	Locking Cortical Screw	3.5 mm	32 mm	8683109330269
0301-033534	Locking Cortical Screw	3.5 mm	34 mm	8683109330270
0301-033536	Locking Cortical Screw	3.5 mm	36 mm	8683109330271
0301-033538	Locking Cortical Screw	3.5 mm	38 mm	8683109330272
0301-033540	Locking Cortical Screw	3.5 mm	40 mm	8683109330273
0301-033542	Locking Cortical Screw	3.5 mm	42 mm	8683109330274
0301-033544	Locking Cortical Screw	3.5 mm	44 mm	8683109330275
0301-033546	Locking Cortical Screw	3.5 mm	46 mm	8683109330276
0301-033548	Locking Cortical Screw	3.5 mm	48 mm	8683109330277
0301-033550	Locking Cortical Screw	3.5 mm	50 mm	8683109330278





0303-033530



Cortical Screws

Reference	Description	Diameter	Length	Barcode
0302-033520	Cortical Screw	3.5 mm	20 mm	8683109330247
0302-033522	Cortical Screw	3.5 mm	22 mm	8683109330248
0302-033524	Cortical Screw	3.5 mm	24 mm	8683109330249
0302-033526	Cortical Screw	3.5 mm	26 mm	8683109330250
0302-033528	Cortical Screw	3.5 mm	28 mm	8683109330251
0302-033530	Cortical Screw	3.5 mm	30 mm	8683109330252
0302-033532	Cortical Screw	3.5 mm	32 mm	8683109330253
0302-033534	Cortical Screw	3.5 mm	34 mm	8683109330254
0302-033536	Cortical Screw	3.5 mm	36 mm	8683109330255
0302-033538	Cortical Screw	3.5 mm	38 mm	8683109330256
0302-033540	Cortical Screw	3.5 mm	40 mm	8683109330257
0302-033542	Cortical Screw	3.5 mm	42 mm	8683109330258
0302-033544	Cortical Screw	3.5 mm	44 mm	8683109330259
0302-033546	Cortical Screw	3.5 mm	46 mm	8683109330260
0302-033548	Cortical Screw	3.5 mm	48 mm	8683109330261
0302-033550	Cortical Screw	3.5 mm	50 mm	8683109330262





Details About Humerus Proximal Plate

Cfr - Peek Plate Manufactured: lt1 ca 30 peek optima



beveled plate edges designed to reduce irritation

Surgical Technic

Patient Position

Place the patient in a beach chair position with the arm draped to aid with fracture reduction. Create an entry site for access to the proximal humerus through a 10 mm standard deltoid-pecto-ral incision made obliquely in line with the delto-pectoral interval. as an alternative, make the incision in a more longitudinal direction, starting at the level of the acromioclavicular joint and extending distally. this approach may potentially be more cosmetic for the patient. iuoroscopy should be used in all cases.Figure A



Figure A

Incision

Sharply dissect down to the level of the fascia and elevate the skin aps. Identify the cephalic vein and develop the interval between the deltoid and the pectoralis. retract the cephalic vein laterally and the pectoralis major medially

Approach

Release the fascia along the lateral border of the coracobrachialis and retract it medially to expose the proximal humerus with the subscapularis tendon attachment. To help facilitate reduction and improve fracture visualization, release the superior one-third of the pectoralis major from the humeral shaft. It is important to place a finger underneath the pectoralis major as it is being released to protect the biceps tendon, which lies directly underneath.

Step 1: Fracture

Surgical technique for experience in the use of cfr peek humerus plate or instruction by a surgeon with corresponding experience is recommended

• when an almost correct reduction of the fragments is achieved and verified by fluoroscopy,





Reduce fracture and fix provisionally Reduce the head fragments and check the reduction under the image intensifier. Fix the reduction with Kirschner wires.

Ref: 8106 - small bone holder key

Note: The locking screws are not suitable for reduction since they cannot exert compression. The head fragments must be reduced before insertion of the locking screws.



Fixation of the humeral head The humeral head fragment and greater tuberosity are preliminarily fi xed with 2.0mm K-wires or that are inserted either in the suture holes at the rim of the plate . When correct positioning of the head fragment and the greater tuberosity is confirmed by fluoroscopy



Step 2 : Position of Plate

The plate is positioned to the bone laterally to the intertubercular sulcus, whereby the superior rim of the plate should be placed approximately 10mm below the superior aspect of the greater tuberosity in order to minimize the risk of subacromial impingement. for preliminary fixation of the plate,



K-wire is inserted in the most distal k-wire hole in the plate to align the plate with the bone axis.

With the preliminary fixed plate in position, fine reduction of the head fragment and the greater tuberosity is performed using the proximal portion of the anatomically pre-shaped plate as support.



correct fragment reduction and the plate positioning have to be verified by Fluoroscopy. If required, the plate position can be slightly adapted by removal of the distal k-wire and shifting of the plate along the k wire hole.



Position plate Position the plate proximally at least 8 mm distal to the upper end of the greater tubercle (rotator cu_i insertion). Determine the position of the plate using a Kirschner wire. Insert the Kirschner wire into the proximal guide hole of the insertion guide below the rotator cu_i so that the Kirschner wire aims at the proximal joint surface.

Note: Placing the plate at too high a level increases the risk of subacromial impingement. Placing the plate too low can prevent the optimal distribution of screws in the humerus head and make it impossible to insert screws in section Centre the plate laterally against the greater tubercle, ensuring that a su icient gap is maintained between the plate and the long biceps tendon (arterial blood supply).

Using the Kirschner wire

Check the position of the Kirschner wire. The tip of the Kirschner wire should be located in the subchondral bone (5–8 mm below the joint surface). Slide the direct measuring device for Kirschner wire 1.6 mm over the Kirschner wire and determine the length of the required screw





Step 3 :Locking Screwing

Insertion of a cancellous locking screw is started with insertion of a in the universal holes of the proximal plate that any proximal hole has the ability to accept 4.0 mm Locking cancellous Screws .



Ref: 6603 - 3.5 mm diameter sleeve for drill

Remove the direct measuring device, Using a drill bit 2.8 mm, predrill the screw hole. Remove the drill bit and the drill sleeve





Ref: 6810 - 2.8 mm diameter quick coupling drill

For accurate measurement, be sure the deepth gauge is fully seated into the hole.locking screws are successively inserted in the humeral head, whereby a minimum number of 5 locking screws is desired. To optimize stability, it is recommended to use more screws than less in the humeral head.

Under repetitive fluoroscopic views, the tip of the drill is inserted in the cancellous bone structure of the humeral head, whereby a true distance of the tip of the drill to the subchondral compacta



Determine the screw length by deepth gauge.





Insert proximal screws

Correct length of the locking screws in the humeral head is essential

Too close of a distance of the screw tip to the subchondral compacta bears an increased risk of cut out in the case of postoperative bone sintering

Insert the locking screw manually and insert a screwdriver shaft. Insert the locking screw through the centering sleeve.



Ensure that the screwdriver tip is fully seated in the screw head, and do not angulate the screwdriver.

Always perform final tightening by hand using the torque limiter. This helps to prevent overtightening of locking screws, and also ensures that these screws are tightened to a torque of 2.5Nm. The device will click when the torque reaches 2.5Nm.



The torque is automatically limited and a clearly audible click signifies that the torque limit has been reached.

With the torque wrench, the final locking of the screw must be done at 2.5 Nm.





Ref: 6002 - AA2 .5 mm screw driwer shaft quick coupling



Ref: 6305 - 3.5 mm diameter torque limiter screw driwer

If possible, the d[°]stal Kirschner wire should be positioned approx. 5 mm above the "calcar". Insert the locking screws in the proximal section depending on the respective fracture situation, Ideally, the plate should be secured with at least 4 or 6 proximal screws or more, particularly if the bone quality is poor.



Ref: 6810 - 2.8 mm diameter quick coupling drill



Ref: 6603 - 3.5 mm diameter sleeve for drill

Under repetitive fluoroscopic views, the tip of the drill is inserted in the cancellous bone structure of the humeral head, whereby a true distance of the tip of the drill to the subchondral compacta

insert 4.0 mm Drill Guide iinto the second head hole on the plate

Determine the screw length by deepth gauge.





Ref: 6202 - small depth gauge for screws

The torque is automatically limited and a clearly audible click signifies that the torque limit has been reached.



Ref: 6305 - 3.5 mm diameter torque limiter screw driwer



Step 4: Non Locking Screwing

The holes for the 3.5mm cortical screws are performed using the 2.8mm drill and the drill guide.

Drill through both cortices for bi-cortical screw fixation.





The correct screw length can be determined by using the depth gauge .

Ref: 6202 - small depth gauge for screws



Remove the drill and drill guide, then insert a 3.5mm nonlocking cortical Screw in the plate.

With the 2.5 mm screw driver insert a 3.5 mm cortical screw of the appropriate length the 3.5 mm nonlocking screw helps draw the plate to the bone,



For more stable fixation and to reduce the risk of screw loosening in the diaphysis, the use of bi-cortical selftapping screws in the distal section of the plate is recommended.



attach a torque limiter to the handle and insert a screwdriver shaft.

use the 2.5 n torque limiter to perform the final locking step for the locking screws



Insert guide sleeve in distal plate hole

The guide sleeve ensures that the locking screw is correctly locked in the plate.



Ref: 6810 - 2.8 mm diameter quick coupling drillL



Ref: 6603 - 3.5 mm diameter sleeve for drill

Note: The threaded hole is perpendicular to the plane of the plate

Always check the correct position and length of the inserted screws by Fluroscopy final fixation of the shaft



Determine the screw length by deepth gauge.

Ref: 6202 - small depth gauge for screws





Attach a torque limiter to the handle and insert a screwdriver shaft.



Ref: 6305 - 3.5 mm diameter torque limiter screw driver



Proximal head cancellous locking screw

insertion

Sleeve the 4.0 mm threaded drill guide into an

head hole until full seated



Use 2,8 drill to drill to the desired depth remove drill guide use the depthgauge to determine screw lenght



Ref: 6810 - 2.8 mm diameter quick coupling drill



remove drill guide use the depthgauge to determine screw lenght

With the 2.5 mm screw driver insert a 4.0 mm cancellous locking screwew







Ref: 6002 - AA2 .5 mm screw driwer shaft quick coupling



Ref: 6305 - 3.5 mm diameter torque limiter screw driwer

Attach a torque limiter to the handle and insert a screwdriver shaft.

Use the 2.5 n torque limiter to perform the final locking step for the leocking screws



Soft Tissue Closure Close the wound in layers with a subarticular stitch and place a drain for early postoperative recovery

final flouroscopic check

After final fixation of the plate with all screws and sutures (if applicable) a final fluoroscopic check is mandatory. Under continuous fl uoroscopy, the humerus should be rotated around its longitudinal axis and the true distance of all screw tips to the articular surface of the humeral head should be



Insert all distal screws

Soft Tissue Closure Close the wound in layers with a subarticular stitch and place a drain for early postoperative recovery



Postoperative treatment

Two small screws should be used in the diaphysis and humeral head to avoid the contact of the plate with the fracture line reducing the risk of periosteal blood supply impairment. the two small screws are available in lenght of 3 mm, 4mm.



Wound Clouser

Soft Tissue Closure Close the wound in layers with a subarticular stitch and place a drain for early postoperative recovery

Postoperative Protocol

Postoperative care is at the discretion of the surgeon. The following protocol is provided as an example. Initiate passive range of motion exercises for the first four weeks, then active assisted for two weeks. Start active range of motion and strengthening at approximately six weeks postoperati-vely when fracture healing is evident on radiograph Optional: Implant Removal Instructions If removal of the implant is desired, remove the screws with the 3.5 mm Quick Release Hex Driver

Rehabilitation

Provides post-operative management and rehabilitation postop: 1-2 week postoperative visit continue physical therapy and range of motion exercises wound check repeat radiographs ofradius staples/sutures removed diagnose and management of early complications postop: ~ 3 month postoperative visit repeat radiographs of the radius diagnosis and management of late complications postop: 1 year postoperative visit

Contraindications

The product should not be used in the following cases:

- The state of bone structure and insufficiency of bone density
- Acute or chronic; local or systemic infections
- serious muscle, neurological or vascular diseases involving the bone in question
- Advanced osteoporosis
- Bone formation disorder
- Severe soft tissue damage
- Allergy to device raw material
- Immature patients with skeletal system

Implant removal

Optional: Implant Removal Instructions If removal of the implant is desired, remove the screws





Ref: 6001 - AA2.0 mm screw driwer shaft quick coupling

To remove the plate, first unlock all screws with the screwdriver before removing them definiti-vely in a second step, otherwise the plate may rotate while the last screw is being removed and cause soft tissue damage. If the screws cannot be removed with the screwdriver loosen the conical extraction screw with a left-handed thread using the T-handle with quick coupling by turning counterclockwise.

Ref: 6106 - 2.5 mm diameter reverse helical screw extractor



catoalog information-sets



No	Product No	Product Name	Qty
1	7802	3.5 mm diameter instrumantation set tray-2	1
2	8111	reduction forceps	1
3	8108	small retractor	1
4	7001	AA2.5 mm fixe handle screw driwer	1
5	8106	small bone holder key	1
6	6303	small length screw driwer	1
7	6305	3.5 mm diameter torque limiter screw driwer	1
8	7000	2.0 fixe handle screw driwer	1



catoalog information-sets



No	Product No	Product Name	Qty
1	7910	3.5mm diameter screw instrumantation set tray-1	1
2	6901	kirshner wire tube	1
3	6202	small depth gauge for screws	1
4	6603	3.5 mm diameter sleeve for drill	1
5	6601	2.0 mm diameter sleeve for drill	1
6	6105	2.0 mm diameter reverse helical screw extractor	1
7	6401	coffee pot	1
8	6106	2.5 mm diameter reverse helical screw extractor	1
9	6510	small screw holder	1
10	6009	t-handle quick coupling holder	1
11	6810	2.8 mm diameter quick coupling drill	1
12	6809	2.0 mm diameter quick coupling drill	1
13	7018	cortical guide	1
14	8102	ancellouse guide	1
15	6102	3.5mm diameter screw extractor	1
16	6101	2.0mm diameter screw extractor	1
17	6001	AA2.0 mm screw driwer shaft quick coupling	1
18	6002	AA2 .5 mm screw driwer shaft quick coupling	1
19	8100	chamfer	1

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Case I



Case II

Post-OP

Pre-OP





