PMGA

Surgical Technique

Signature ORTHOPAEDICS

Technique Instruction for Signature Orthopaedics PMGA

OVERVIEW

This implant is specifically designed to address glenoid retroversion where the wear pattern generally conforms to the Walch grade B2 and C. The implant is designed to match with the Signature Orthopaedics Shoulder Arthroplasty system. However, with slight modifications to the augment and the implanted glenoid component, matching with other vendor HDPE glenoid components may be possible.
Currently access under the TGA Authorised Prescriber authorisation limits use to glenoid retroversion.
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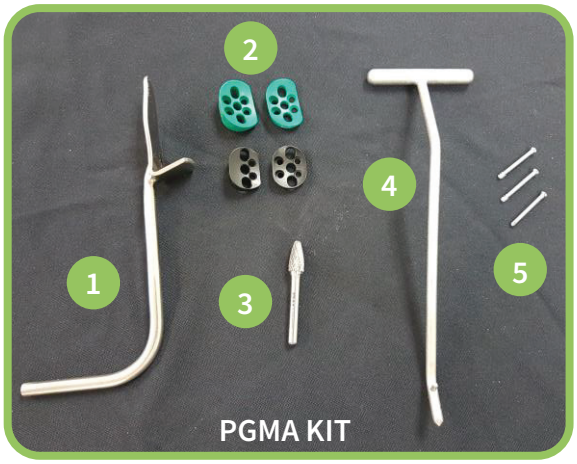
Use of this augment is analogous to the surgical approach of using bone graft to address posterior glenoid bone loss, into which a HDPE glenoid component is cemented. Specific surgical management can vary consistent with a surgeon's experience and the patient anatomy.

PRE-OPERATIVE PLANNING

An adequate appreciation of the glenoid morphology is essential as part of the surgical planning. Characterisation of glenoid deformity is best done using CT scanning, ideally with 3D reformation. While not essential, a 3D virtual surgical planning capability will facilitate optimal augment selection and positioning, as well as providing an appreciation of specific anatomical features that may present challenges during the arthroplasty. The anterior scapula is a critical and generally consistent anatomical reference point for assessment of glenoid version, and thus ensuring this region has anticipated morphology will confirm the appropriateness of using it as an alignment reference.

IMPLANT PMGA RANGE

30 degree large
15 degree large
30 degree small
15 degree small



PGMA KIT

SPECIAL INSTRUMENTS (SUPPLIED AS PMGA KIT):

1. Anterior scapula glenoid alignment guide
2. Trial implants: 30 degree - large and small 15 degree - large and small
3. Surgical bur – 8mm x 20mm / tree profile / double cut bur
4. PMGA peg hole stabilizer
5. Bone screws (3.5mm non-locking, low profile head)
6. Transparent glenoid surface checker (not yet available)

SPECIFIC ADDITIONAL EQUIPMENT (SUPPLIED AS PART OF USUAL SURGICAL SET UP)

1. Curved Kocher's forceps – to stabilise PMGA onto the glenoid during initial drilling
2. 2.5mm drill and depth gauge – to drill through PMGA to facilitate screw fixation.

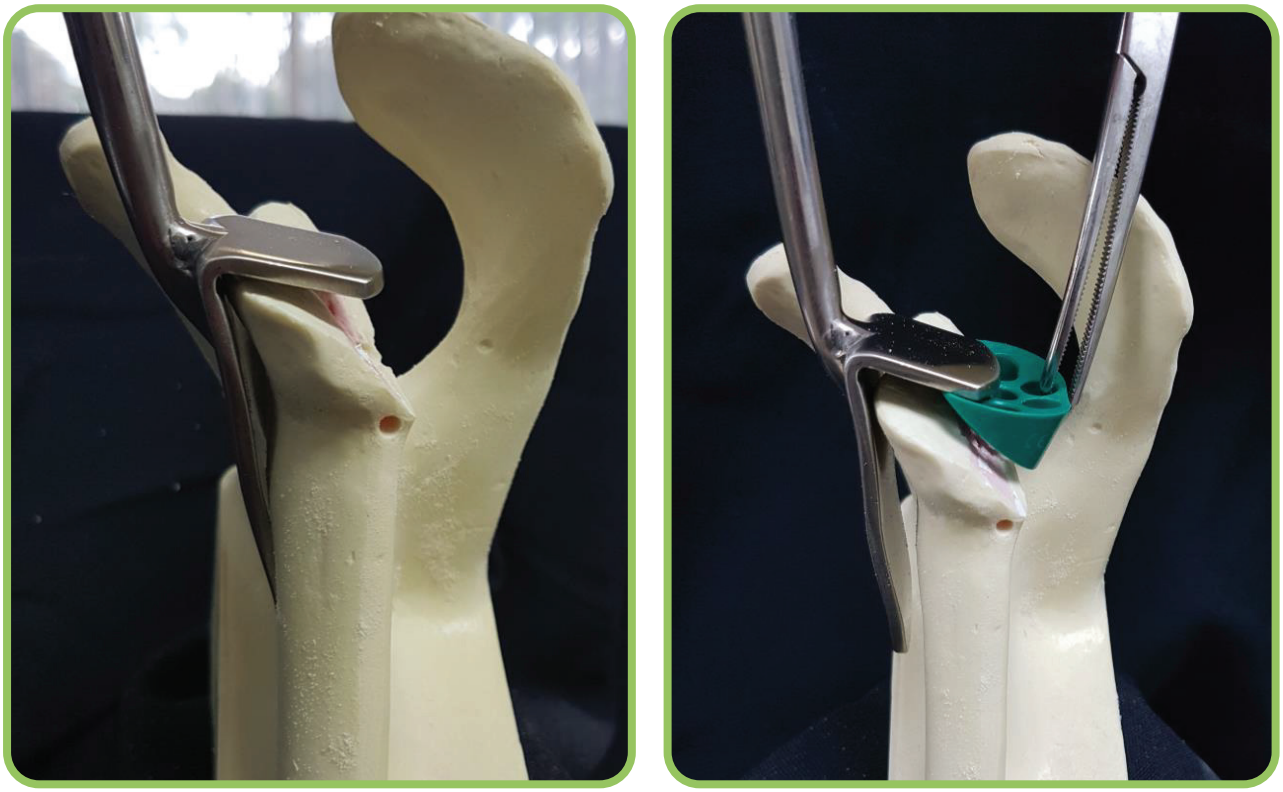
STANDARD SHOULDER ARTHROPLASTY INSTRUMENTS

Usual instruments as supplied by vendor to facilitate glenoid exposure, placement, and cementation.
Fast setting PMGA cement with antibiotic.

Surgical Technique

STANDARD APPROACH WILL BE ABBREVIATED, AND SPECIFIC TMGA STEPS WILL BE DETAILED.

1. Patient positioning, anti-infection and thromboembolic prophylaxis as desired
2. Routine skin preparation and draping. Alcoholic Chlorhexidine currently recommended.
3. Standard skin incision and development of delto-pectoral interval.
4. Biceps tenotomy and tenodesis, plus release rotator interval along line of biceps to base of coracoid process.
5. Subscapularis tendon release by either osteotomy (typically in men) or sharp dissection (typically in women). Tag and reflect.
6. Dislocate humeral head and trim osteophytes to define margin.
7. Excise head using standard instrument specific approach. Beware “flat cap deformity”. *** Excessive posterior head resection may compromise posterior rotator cuff***
8. Prepare humeral canal and insert trial stem.
9. Mobilise humerus to display glenoid. Locate and protect axillary nerve.
10. Resect anterior capsule and insert anterior glenoid retractor.
11. Insert posterior humeral retractor and progressively excise anterior, inferior and posterior capsule.
12. Survey glenoid to assess version. Insert Anterior scapula glenoid alignment guide with relevant trial implants to assess correction needed.



Trial implant with **Anterior scapula glenoid alignment guide** to assess version

13. Remove loose anterior glenoid osteophytes to improve access.

14. When adequate glenoid exposure is achieved, use the supplied bur to contour the glenoid face to match the back side of augment, with modest version correction as needed. *** The PMGA is available in 2 different correction angles (15 degrees and 30 degrees), and 2 sizes. The large implant is suited to the 46mm and 52mm glenoid, and the medium to the 40mm glenoid component. To achieve the desired glenoid version of less than 10 degrees of retroversion, use the following correction algorithm, with a small or large implant depending on the inferior to superior dimensions of the glenoid. The maximum acceptable correction by eccentric reaming is 10 degrees. ***

RETROVERSION	AMOUNT OF GLENOID PREPARATION	IMPLANT USED
10°	eccentric ream to neutral	standard implant, no PMGA
15°	minimal ream to smooth	**15°** PMGA plus standard glenoid
20°	eccentric ream to **15°** and smooth	**15°** PMGA plus standard glenoid
25°	increase retroversion to **30°**	**30°** PMGA plus standard glenoid
30°	minimal ream to smooth	**30°** PMGA plus standard glenoid
30+°	eccentric ream to **30°** and smooth	**30°** PMGA plus standard glenoid

Bone graft can be added under the PMGA to address excessive retroversion or glenoid defects as may occur in revision surgery.

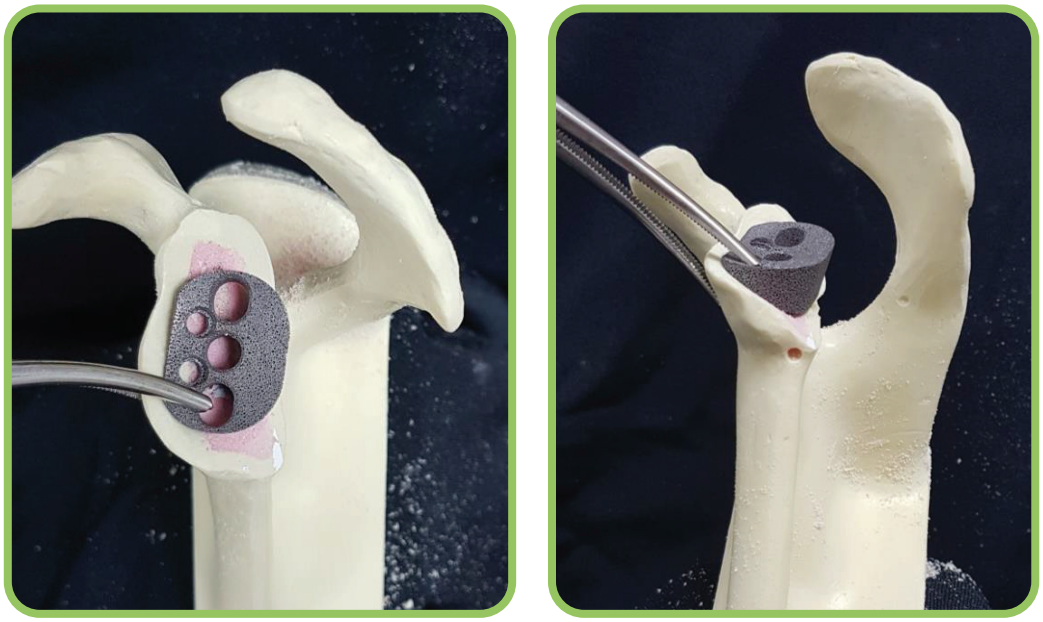
Using bur to smooth glenoid surface.

Checking correction with trial

15. Check final preparation correction using trial implant and Anterior scapula glenoid alignment guide.

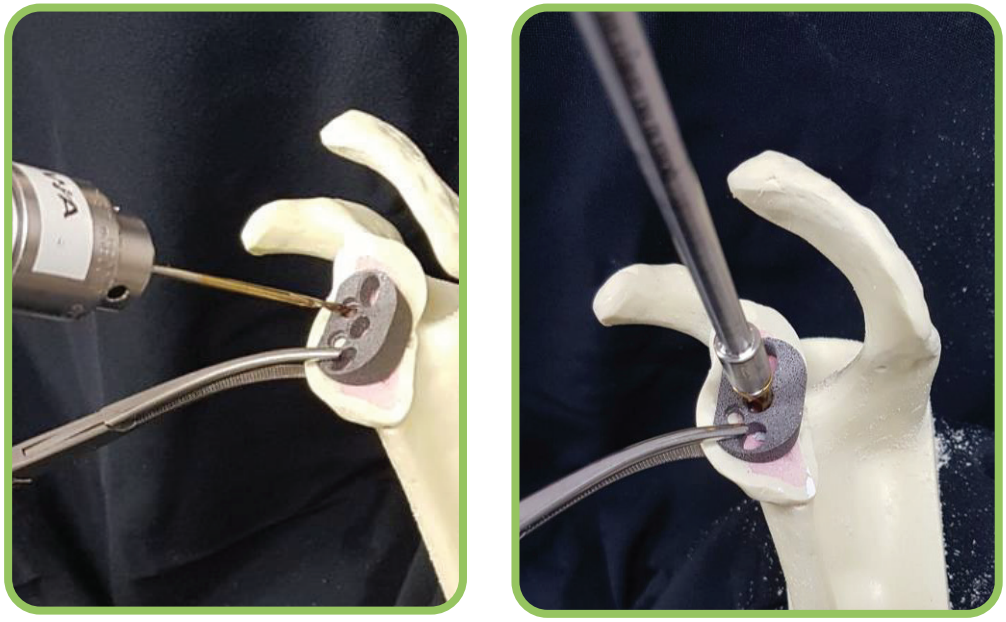
16. Open the definitive PMGA implant and manually position it in the desired location on glenoid face. The PMGA should be centrally positioned, 3-4mm posterior to the anterior glenoid margin, and should be position “below the horizon” of the anterior rim. The standard glenoid component is longer than the PMGA on its anterior margin which allows the glenoid component to rest on the native glenoid anterior rim, thus avoids both excessive anterior positioning of the glenoid component and over stuffing the joint.

17. Stabilise the TMGA in the desired position using a Kocher's forceps between the lower peg hole and the anterior wall of the scapula.



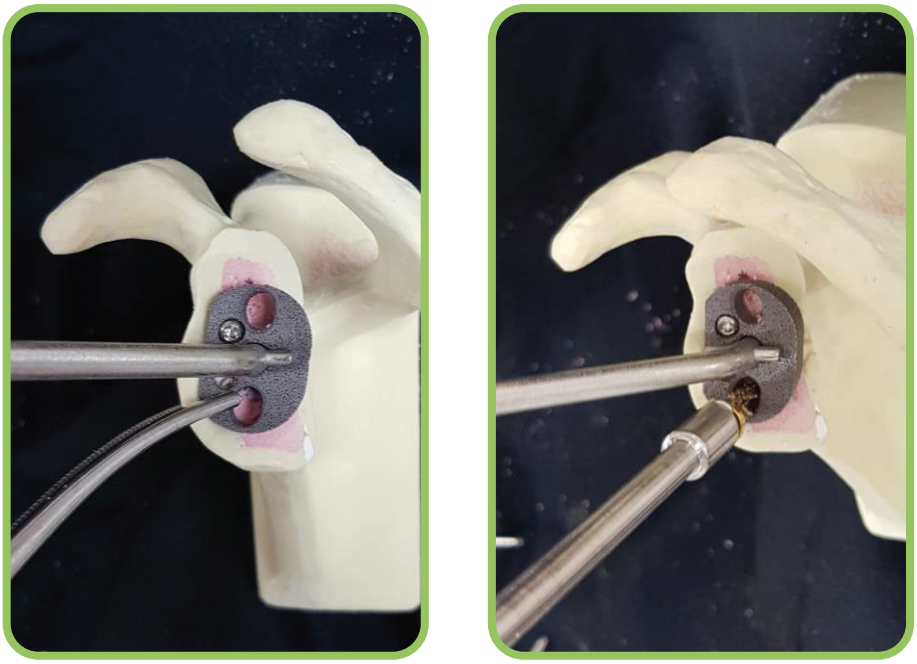
PMGA held in place with Kocher's forceps

18. Once reliably held in position, drill upper anterior screw hole and insert screw. Depending on access and available screw holes, drill lower posterior screw hole and insert screw. Reposition Kocher's forceps if necessary, and drill lower anterior screw hole. Two or three screws should be sufficient.
19. Ensure Kocher's forceps is stabilising the PMGA and using the large peg drill from the arthroplasty set, drill through the PMGA to prepare the central peg hole into the glenoid bone. *** Ensure drilling is perfectly in line with the PMGA peg hole to avoid the drill jamming and dislodging the augment. Use arthroplasty drill guide to assist if concerned****



Kocher's forceps to stabilize PMGA during initial drilling and screw insertion

20. Insert PMGA Peg hole stabilizer into central PMGA peg hole and either reposition or remove Kocher's forceps as access and augment stability dictates. Drill through upper and lower PMGA peg holes into glenoid. Trim anterior rim to ensure glenoid bed (anterior rim and PMGA) is flat.



PMGA Peg hole stabilizer to facilitate upper and lower peg hole preparation

21. Insert trial glenoid component to ensure satisfactory seating. Use arthroplasty drill guide to enlarge and line up the holes if the glenoid component does not fit easily.

22. Re-check glenoid version with PMGA and trial implant using Anterior scapula glenoid alignment guide.

Recheck glenoid version correction and insert trial implant

23. When cementing the glenoid component, multiple cement insertions and pressurisation is recommended. This is done by injecting cement into the peg holes, and then inserting the pegged impactor from the arthroplasty set. This is typically done three times. However only insert small amounts of cement deep into the actual glenoid drill hole to avoid cement escaping into the PMGA-glenoid interface and potentially compromising bony integration into the augment.
24. Apply a small amount of cement to the back side of the glenoid component and implant.
25. While stabilizing the glenoid component, remove excess cement before it sets.
26. Once the cement has hardened, VERY carefully deliver the humeral head into view.
*****Due to the degree of posterior positioning and translation of the humerus, and the long posterior face of the PMGA and glenoid component, premature inadvertent external rotation or anterior traction on the humerus may dislodges the glenoid construct. Use lateral traction with a hook and careful manipulation to disengage the humerus. Commencing the anterior mobilisation of the proximal humerus prior to removing the posterior retractor can assist in the disengagement and reduction. *****
27. Once humerus has been presented, standard humeral stem insertion and head trialling is performed. Because the glenoid is now more anterior and lateral than pre-operatively, the head height is generally less than would be anticipated if using the excised humeral head as a reference.
28. Once definitive humeral stem and head are inserted, reattach the subscapularis tendon with non-absorbable suture as desired. Formal closure of the rotator interval will significantly enhance the subscapularis tendon repair strength and reduce the tendency for superior migration of the humeral head. Access for such closure is improved by extending the shoulder and gently retracting the deltoid.
29. Further wound closure as desired.

POST-OPERATIVE MANAGEMENT:

Typically in a sling of collar and cuff for 4 weeks with limited exercises including pendular and gentle flexion to horizontal, plus intermittent light functional use out of the sling at waist and lower chest level.
At 4 weeks progress to normal activities with specific attention on rotator cuff strengthening. Avoid excessive load or stress for 3 months.

POST-OPERATIVE RADIOLOGICAL SURVEILLANCE:

Post-operative Day 1 – AP glenoid, AP and lateral view of shoulder. Post-operative 4 weeks - AP glenoid, AP and lateral, plus axillary view of shoulder Post-operative 6 months, 12 month and then yearly - - AP glenoid, AP and lateral, plus axillary views

PATIENT OUTCOME ASSESSMENT:

ASES / Oxford Shoulder score / VAS pain score / forward elevation measurement - -
Pre-op / 3 months / 6 months / 12months / yearly thereafter.