Aequalis®-Glenoid Keeled and Pegged

Surgical Technique
# TABLE OF CONTENTS

<table>
<thead>
<tr>
<th>Section</th>
<th>Pages</th>
</tr>
</thead>
<tbody>
<tr>
<td>COMMON OPERATIVE TECHNIQUES FOR THE KEELED AND PEGGED AEQUALIS-GLENOIDS</td>
<td>p. 1 - 3</td>
</tr>
<tr>
<td>IMPLANTATION OF THE AEQUALIS KEELED GLENOID</td>
<td>p. 4 - 5</td>
</tr>
<tr>
<td>IMPLANTATION OF THE AEQUALIS PEGGED GLENOID</td>
<td>p. 6 - 7</td>
</tr>
<tr>
<td>INSTRUMENTATION FOR AEQUALIS KEELED AND PEGGED GLENOIDS</td>
<td>p. 8 - 9</td>
</tr>
<tr>
<td>KEELED AND PEGGED AEQUALIS-GLENOID IMPLANTS</td>
<td>p. 10</td>
</tr>
</tbody>
</table>
COMMON OPERATIVE TECHNIQUES
FOR THE KEELED AND PEGGED AEQUALIS-GLENOIDS

AEQUALIS-GLENOID CONCEPT

The Aequalis-glenoid system is designed to give the surgeon the flexibility to intra-operatively decide between the implantation of a keeled or pegged glenoid.

1. Preoperative planning

A careful analysis of X-rays and axial CT scan views is recommended before surgery to evaluate the following parameters: osteophytes, anterior and, more importantly, posterior wear of the glenoid, as well as the location, orientation and depth of the medullary canal.

2. Exposure

With the arm abducted and internally rotated, a posterior glenoid retractor is placed on the posterior glenoid border as the proximal humerus is dislocated posteriorly and inferiorly. An angled retractor placed above the glenoid and an angled Kolbel retractor placed in the subscapular fossa are used to complete the exposure (Fig 1).

If preoperatively the humerus rests in a fixed posteriorly subluxed position, then the posterior capsule may be stretched out sufficiently so that a posterior capsular release for exposure may not be necessary. If, after releasing the entire anterior capsule down to 6 o’clock on the glenoid face the shoulder is still tight, then additional capsule is released around the posterior inferior corner and up the posterior side until the humerus can be adequately retracted for exposure (labrum and posterior capsule) (Fig 2). The glenoid retractor then is moved upward if more of the posterior release needs to be completed (Fig 3).

Fig. 1

Right shoulder

Fig. 2

Fig. 3
3. Choice of the glenoid size

Selection of the appropriate sized glenoid depends on the diameter of the Aequalis humeral head and must be done according to the table below.

<table>
<thead>
<tr>
<th>Aequalis humeral head diameter</th>
<th>Glenoid size (implant)</th>
<th>Reamer size</th>
<th>Peripheral drill guide size</th>
<th>Trial glenoid size</th>
</tr>
</thead>
<tbody>
<tr>
<td>37 39</td>
<td>Small</td>
<td>Small (black)</td>
<td>Small (black)</td>
<td>Small (black)</td>
</tr>
<tr>
<td>41 43</td>
<td>Medium</td>
<td>Medium (red)</td>
<td>Medium (red)</td>
<td>Medium (red)</td>
</tr>
<tr>
<td>46 48</td>
<td>Large</td>
<td>Large (yellow)</td>
<td>Large (yellow)</td>
<td>Large (yellow)</td>
</tr>
<tr>
<td>50 52</td>
<td>Extra Large</td>
<td>Extra Large (green)</td>
<td>Extra Large (green)</td>
<td>Extra Large (green)</td>
</tr>
</tbody>
</table>

The color code refers to the trial implants as well as the instruments to be used for each size.

4. Preliminary central drilling of the glenoid medullary canal

The central hole drill guide is positioned on the glenoid surface (Fig 1) and the central hole is drilled with the central hole drill bit (grey handle) (Fig 2).
5. Resurfacing the glenoid

Based on the predetermined glenoid size, reaming must be performed with the corresponding reamer. The reamer is designed with a pilot tip which is inserted in the existing central hole. The reamer should remain perpendicular to the medullary canal. The goal of reaming is to obtain a bony surface that matches the base of the glenoid component (Fig 3).

![Diagram showing reaming process](image)

However, it is not advisable to ream down to cancellous bone because of the limited glenoid bone stock (Fig 4). Over aggressiveness of reaming should be avoided to prevent possible glenoid fracture.

![Diagram showing cancellous bone](image)

At this step in the procedure, depending on the bone stock available and surgeon preference, the decision is made between the implantation of the keeled or pegged glenoid.
IMPLANTATION OF
THE AEQUALIS KEELED GLENOID

6. Preparation for the keel slot

The peripheral holes drill guide for the keeled glenoid is positioned on the reamed glenoid surface in the central hole (Fig 1). The superior hole is drilled first with the keel peripheral hole drill bit (Fig 2) and then stabilized with a peg (Fig 3).

The inferior hole is then drilled (Fig 3).

The drill guide and peg are then removed. The remaining bony bridges between the three holes are then broken with a rongeur or a small osteotome. The keel punch is used to compact the glenoid cancellous bone. The compaction of the cancellous bone is a preferred technique to improve glenoid component fixation (Fig 4).
7. Positioning the keeled glenoid component

The trial component is used to check for appropriate size and positioning (Fig 1). Two windows, anterior and posterior, allow visualization of the implant bone interface (Fig 2). The trial component is removed and the keel space and glenoid surface are carefully cleaned and dried.

Bone cement is introduced and the final implant is impacted with the glenoid impactor (Fig 3).
8. Preparation for the peripheral peg holes

The peripheral holes drill guide for the pegged glenoid is positioned on the reamed glenoid surface. The superior hole is drilled first with the pegged peripheral hole drill bit (Fig 1 and Fig 1’) and then stabilized with a peripheral peg (Fig 2).

The first inferior hole is drilled with the same peripheral hole drill bit (Fig 2 and Fig 2’) and stabilized with an additional peg (Fig 3).

The second inferior hole is then drilled (Fig 3).

Upon completion, the drill guide and pegs are removed.
9. Positioning the pegged glenoid component

The trial component is used to check for appropriate size and positioning (Fig 1). Two windows, anterior and posterior, allow visualization of the implant bone interface (Fig 2). The trial component is removed and the peg holes and glenoid surface are carefully cleaned and dried.

Cementing of the component is then performed with a low viscosity cement introduced with a syringe. The final implant is impacted with the glenoid impactor (Fig 3).

Note:
The pegs should not be altered in any manner before implantation.
## INSTRUMENTATION FOR AEQUALIS KEELED AND PEGGED GLENOIDs

### Common instrumentation:

<table>
<thead>
<tr>
<th>Instrumentation</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Kolbel retractor</strong></td>
<td>Wide</td>
</tr>
<tr>
<td></td>
<td>Ref. MWA681</td>
</tr>
<tr>
<td><strong>Narrow</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Ref. MWA682</td>
</tr>
<tr>
<td><strong>Hohmann retractor</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Ref. MWA683</td>
</tr>
<tr>
<td><strong>Posterior glenoid retractor</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Ref. MWA651</td>
</tr>
<tr>
<td><strong>Stabilization peg clamp</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Ref. MWA653</td>
</tr>
<tr>
<td><strong>Trial glenoid clamp</strong></td>
<td></td>
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<tr>
<td></td>
<td>Ref. MWA652</td>
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<tr>
<td><strong>Glenoid impactor</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Ref. MWA654</td>
</tr>
<tr>
<td><strong>Drill guide handle</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Ref. MWA210</td>
</tr>
<tr>
<td><strong>8 mm wrench</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Ref. MKL010</td>
</tr>
<tr>
<td><strong>12 mm wrench</strong></td>
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<tr>
<td></td>
<td>Ref. MGB306</td>
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</table>

<table>
<thead>
<tr>
<th>Instrumentation</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Central hole drill guide</strong></td>
<td>Ø 6 mm central hole</td>
</tr>
<tr>
<td></td>
<td>Ref. MWA665</td>
</tr>
<tr>
<td><strong>Central hole drill bit with handle</strong></td>
<td>Ø 6 mm central hole - 17 mm length (grey)</td>
</tr>
<tr>
<td></td>
<td>Ref. MWA689</td>
</tr>
<tr>
<td><strong>Glenoid reamer with handle</strong></td>
<td>(color coded)</td>
</tr>
<tr>
<td><strong>Small</strong></td>
<td>(black)</td>
</tr>
<tr>
<td></td>
<td>Ref. MWA685</td>
</tr>
<tr>
<td><strong>Medium</strong></td>
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</tr>
<tr>
<td></td>
<td>Ref. MWA686</td>
</tr>
<tr>
<td><strong>Large</strong></td>
<td>(yellow)</td>
</tr>
<tr>
<td></td>
<td>Ref. MWA687</td>
</tr>
<tr>
<td><strong>Extra Large</strong></td>
<td>(green)</td>
</tr>
<tr>
<td></td>
<td>Ref. MWA688</td>
</tr>
</tbody>
</table>
## INSTRUMENTATION FOR AEQUALIS KEELED AND PEGGED GLENOIDS

### Keeled instrumentation:

- **Peripheral holes drill bit**
  - Drill bit with handle Ø 6 mm - length 14 mm
  - Ref. MWA691

- **Peripheral holes keeled glenoid drill guide**
  - Small
    - Ref. MWA661
  - Medium
    - Ref. MWA662
  - Large
    - Ref. MWA663
  - Extra Large
    - Ref. MWA664

- **Glenoid stabilization peg x 2**
  - Ref. MWA659

- **Glenoid keel punch**
  - Ref. MWA692

- **Trial keeled glenoid (color coded)**
  - **Small** (black)
    - Ref. MWA655
  - **Medium** (red)
    - Ref. MWA656
  - **Large** (yellow)
    - Ref. MWA657
  - **Extra Large** (green)
    - Ref. MWA658

### Pegged instrumentation:

- **Peripheral holes drill bit**
  - Drill bit with handle Ø 6 mm - length 7/9 mm
  - Ref. MWA690

- **Peripheral holes pegged glenoid drill guide**
  - Small
    - Ref. MWA677
  - Medium
    - Ref. MWA678
  - Large
    - Ref. MWA679
  - Extra Large
    - Ref. MWA680

- **Glenoid stabilization peg x 3**
  - Ref. MWA659

- **Trial pegged glenoid (color coded)**
  - **Small** (black)
    - Ref. MWA673
  - **Medium** (red)
    - Ref. MWA674
  - **Large** (yellow)
    - Ref. MWA675
  - **Extra Large** (green)
    - Ref. MWA676
Keeled Glenoids

Small
Ref. DWB 210

Medium
Ref. DWB 211

Large
Ref. DWB 212

Extra Large
Ref. DWB 213

Pegged Glenoids

Small
Ref. DWB 215

Medium
Ref. DWB 216

Large
Ref. DWB 217

Extra Large
Ref. DWB 218

For more information, call toll free 1-888-TORNIER (867-6437) or contact your local representative

This surgical technique has been developed in conjunction with TOM NORRIS, M.D., (SAN FRANCISCO).