Surgical Placement of Ratcliffe BioMimic During an Open Surgery

1. **Selection of Ratcliffe BioMimic size and placement at repair site**
   The surgical preparation of rotator cuff repair, including placement of repair sutures through tendon is completed, but attachment to bone anchors is not done, therefore allowing placement of sutures for Ratcliffe BioMimic.

2. **Select width of Ratcliffe BioMimic**
   Ratcliffe BioMimic should cover the width of the rotator cuff tear repair, therefore providing mechanical augmentation across all of the tendon-to-bone repair line, and also any tendon-to-tendon repair (for example, margin convergence).
3. **Identify location of medial tendon sutures.**
   These should be positioned medially to repair sutures, laterally to muscle, and within the projected location of Ratcliffe BioMimic.

4. **Place sutures in tendon**
   The selection of number and type of suture is at the surgeon's discretion, and some recommendations are below. More sutures placed medially and laterally will enhance the functionality of the device.
   - 12 mm device: 2 simple sutures separated by 8 mm
   - 25 mm device: 3 - 4 simple sutures at 5 mm intervals
   - 25 mm device: 2 simple sutures placed 5 mm from edge, 1 mattress suture centrally
   - 25 mm device: 3 mattress sutures, placed 5 mm from edge and centrally.
   - 40 mm device, 4 – 6 simple sutures
   - 40 mm device: 2 simple, 1 mattress stitch, 2 simple

When these sutures are in place, the rotator cuff repair should be completed.

5. **Placement of lateral bone anchors**

The objective is to maximize uniform attachment of Ratcliffe BioMimic to the bone. Bone anchors (preferably threaded to maximize load-bearing potential) are usually used to fix Ratcliffe BioMimic laterally to the bone. These may be anchors shared with fixing the rotator cuff tendon to the bone, or may be anchors dedicated to attaching Ratcliffe BioMimic to bone. The anchors should be placed laterally to the rotator cuff repair (if dedicated to Ratcliffe BioMimic), or at the lateral position of the repair (if shared with rotator cuff repair). The anchors should be positioned evenly over the projected position of Ratcliffe BioMimic, to uniformly distribute the load between the device and the anchors. There is flexibility in how many sutures, and what type of stitch is used. For example:

- 12 mm device: 1 bone anchor to support 2 simple sutures
- 25 mm device: 2 bone anchors to support 4 simple sutures
- 25 mm device: 2 bone anchors to support 4 mattress sutures
- 25 mm device: 2 bone anchors to support 2 mattress sutures
- 25 mm device: 3 bone anchors to support 3 mattress sutures
- 25 mm device: 3 bone anchors to support 6 simple sutures
- 25 mm device: 3 bone anchors to support 1 mattress suture centrally, 4 simple sutures anterior and posterior
- 40 mm device: 3 bone anchors to support 6 simple sutures
- 40 mm device: 3 bone anchors to support 3 - 6 mattress sutures

6. **Select length of Ratcliffe BioMimic**

The objective is to select the length of Ratcliffe BioMimic so that it extends from the medial sutures to the lateral bone anchors.

- A bite size of >5 mm is used to place the sutures internal to the welded ends of Ratcliffe BioMimic.
- The type of suture selected, particularly at the bone anchor site, provides flexibility in selection of the length of Ratcliffe BioMimic.

For example, if Ratcliffe BioMimic extends over the bone anchors then mattress stitches are more likely to be used, and if Ratcliffe BioMimic does not cover the bone anchors, either mattress, simple or a combination of both may be used. Simple sutures overlapping the end of Ratcliffe BioMimic will prevent any tendency of the lateral end of the device to lift from the bone surface.

7. Suture Ratcliffe BioMimic to anchors and tensioning

The lateral sutured are completed, ensuring tension is applied along the length of Ratcliffe BioMimic, to ensure load sharing over the rotator cuff repair site. Additional sutures along the anterior and posterior edges of Ratcliffe BioMimic can then be placed for additional fixation strength.