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3
4 **Appendix**

5 **Surgical Technique**

6 *Anesthesia, Patient Positioning, and Other General Considerations*

7 Following administration of regional and general anesthesia, a Foley catheter is placed
8 and the patient is positioned in the lateral decubitus position with all pressure points padded. A
9 post is utilized posteriorly at the lumbosacral junction and the patient's torso is stabilized with
10 silk tape extending from the lumbosacral post to the inferior margin of the rib cage. The
11 operative leg is prepped and draped into the field to enable unencumbered manipulation of the
12 hip during the procedure. The operative field should extend from the gluteal cleft posteriorly to
13 the umbilicus anteriorly to permit adequate access for the two-incision approach. Cell saver is
14 utilized throughout the procedure and the anesthesiologist maintains optimal mean arterial blood
15 pressure of 60 – 65 mmHg. Preoperative antibiotics and 1000 mg of tranexamic acid are
16 administered 30 minutes prior to incision, with the tranexamic acid re-dosed after 3 hours to
17 reduce perioperative bleeding.

18

19 *Posterior Approach and Bony Cuts*

20 The operative leg is placed on a mayo stand with the hip extended and knee flexed to
21 relax the sciatic nerve. A 4 to 6 cm oblique incision is made in line with the gluteus maximus
22 fibers, positioned equidistant from the greater trochanter and ischial tuberosity and centered on
23 the proximal aspect of the greater trochanter. Subcutaneous dissection is carried down to the

24 gluteus maximus fascia which is incised in line with the muscle fibers and tagged for retraction
25 and manipulation. The surgeon's index fingers are then utilized to bluntly dissect the gluteus
26 maximus fibers in line with the fascial incision to expose the perineural fat overlying the sciatic
27 nerve. Care is taken to preserve a common plane as the posterior approach is deepened. A self-
28 retaining Bankart retractor is then inserted to retract the gluteus maximus muscle fibers. The
29 sciatic nerve is mobilized from the greater sciatic notch to the level of the hamstrings and
30 reflected posteriorly, bringing into view the short external rotators. A central interval is created
31 in line with the short external rotator fibers using long Metzenbaum scissors. Angled lane
32 retractors are then placed through the interval and directed proximally into the greater sciatic
33 notch and distally into the infracotyloid fossa, exposing the ischium just beneath the hip joint
34 (Figure 1A). The ischial bony cut is then initiated with an oscillating saw (Precision, Stryker),
35 preserving 10-15 mm of posterior column (Figure 1). After both near and far cortices are cut in
36 the distal aspect of the osteotomy, a curved osteotome is used to extend the bone cut 2-3 cm
37 proximally at an approximate 120-degree angle (Figure 1B), again addressing both near and far
38 cortices. At the proximal third of this upward-directed osteotomy, only the near cortex is cut. The
39 sciatic nerve is directly visualized and protected throughout this portion of the procedure and
40 fluoroscopy is not required. When the osteotomy has been completed, the interval in the short
41 external rotators is re-approximated and the gluteus maximus fascia is closed. Subcutaneous and
42 skin closure is performed per routine and a sterile dressing applied. The patient is then
43 repositioned supine by having the circulating nurse remove the lumbosacral post and silk tape
44 under the drapes, and utilizing the draw sheet to turn the patient while the surgeon monitors the
45 pelvis and lower extremities. The original draping is preserved and there is no need to re-prep

46 and drape. All pressure points are again padded under the drapes and attention is directed to the
47 anterior pelvis.

48

49 *Anterior Approach and Bony Cuts*

50 A 4-6 cm oblique incision is made one fingerbreadth below and in line with the iliac
51 crest, centered on the anterior superior iliac spine (ASIS). Subcutaneous dissection is carried
52 down to the fascial layer and the skin is mobilized to the inner border of the iliac crest. The
53 interval between the sartorius and tensor fascia lata (TFL) is identified just distal to the ASIS by
54 palpation and passive hip flexion/extension. A triangle is placed behind the knee to gently flex
55 the hip while the TFL/sartorius interval is developed. The dissection is extended subperiosteally,
56 proximally along the iliac crest to elevate the external oblique aponeurosis. The ilioinguinal
57 ligament/sartorius insertion is elevated from the ASIS and tagged for identification and later
58 repair. Care is taken to maintain subperiosteal dissection at the level of the iliac crest and ASIS
59 to preserve the lateral femoral cutaneous nerve (LFCN). Dissection is carried into the inner
60 pelvis elevating the iliacus muscle and inferiorly into the sulcus between the ASIS and anterior
61 inferior iliac spine (AIIS). The hip is then flexed to 70 degrees to relax the iliopsoas and partial
62 detachment of proximal rectus fiber from the AIIS is performed, to facilitate access to the pubic
63 root. An angled crescentic osteotome is advanced subperiosteally along the superior cortex of the
64 pubic root and under the hip flexor, in preparation for the pubic osteotomy. Fluoroscopic views
65 are obtained to position the osteotome approximately 5 mm medial to the medial teardrop,
66 angled laterally to complete the inferior aspect of the pubic cut just medial to, or at, the medial
67 border of the teardrop. A specifically designed sciatic notch retractor is then placed in the inner

68 pelvis and the iliac step cuts are made with a reciprocating saw in accordance with the desired
69 degree of lateral correction (Figure 2A).¹ A modification is made to the C-cut, which is directed
70 inferiorly, using an angled crescentic osteotome. The posterior aspect of the iliac cut (C-cut) is
71 then connected to the proximal aspect of the ischial cut under fluoroscopic visualization (Figure
72 2B) to complete the osteotomy and mobilize the central acetabular fragment (CAF). Importantly,
73 during this step only the inner pelvic cortex needs to be cut when connecting the C-cut to the
74 ischial cut, because the outer cortex was cut through the posterior approach. Given that the
75 sciatic nerve lies in close proximity to the distal outer cortex, and this area was already cut 3 cm
76 proximally through the posterior approach, the risk of nerve damage is low. The corrective
77 maneuver is then performed using a joystick type external fixator with two 5.0 mm Schanz pins¹,
78 and the CAF is provisionally stabilized with pins. A digital flat-plate x-ray is obtained with
79 orientation to match the preoperative weight bearing and standardized AP pelvis radiograph to
80 allow for direct comparison of the repositioned CAF. The hip is checked for range of motion
81 (ROM) to ensure that overcorrection (and resultant impingement) has not occurred by comparing
82 it to the preoperative examination under anesthesia. When the correction is deemed optimal,
83 three to four cannulated screws are inserted to stabilize the CAF (4.0 – 5.5mm cannulated, fully
84 threaded metal screws, Smith & Nephew). The exposed A-cut and proud AIIS (if present) are
85 removed to avoid the “double bump” deformity and the bone is placed into the C-cut gap as bone
86 graft. The hip is again assessed for functional range of motion and further AIIS reduction is
87 completed as needed to eliminate sub-spine impingement. The rectus femoris is then reattached
88 using all-suture anchors. The sartorius and ilioinguinal ligament are repaired through bone

89 tunnels to the ASIS and the fascia is closed. Skin is closed per routine and a sterile dressing is

90 applied.

91 **References**

- 92 1. Mei-Dan O, Jewell D, Garabekyan T, et al. The Birmingham Interlocking Pelvic Osteotomy
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94 31.