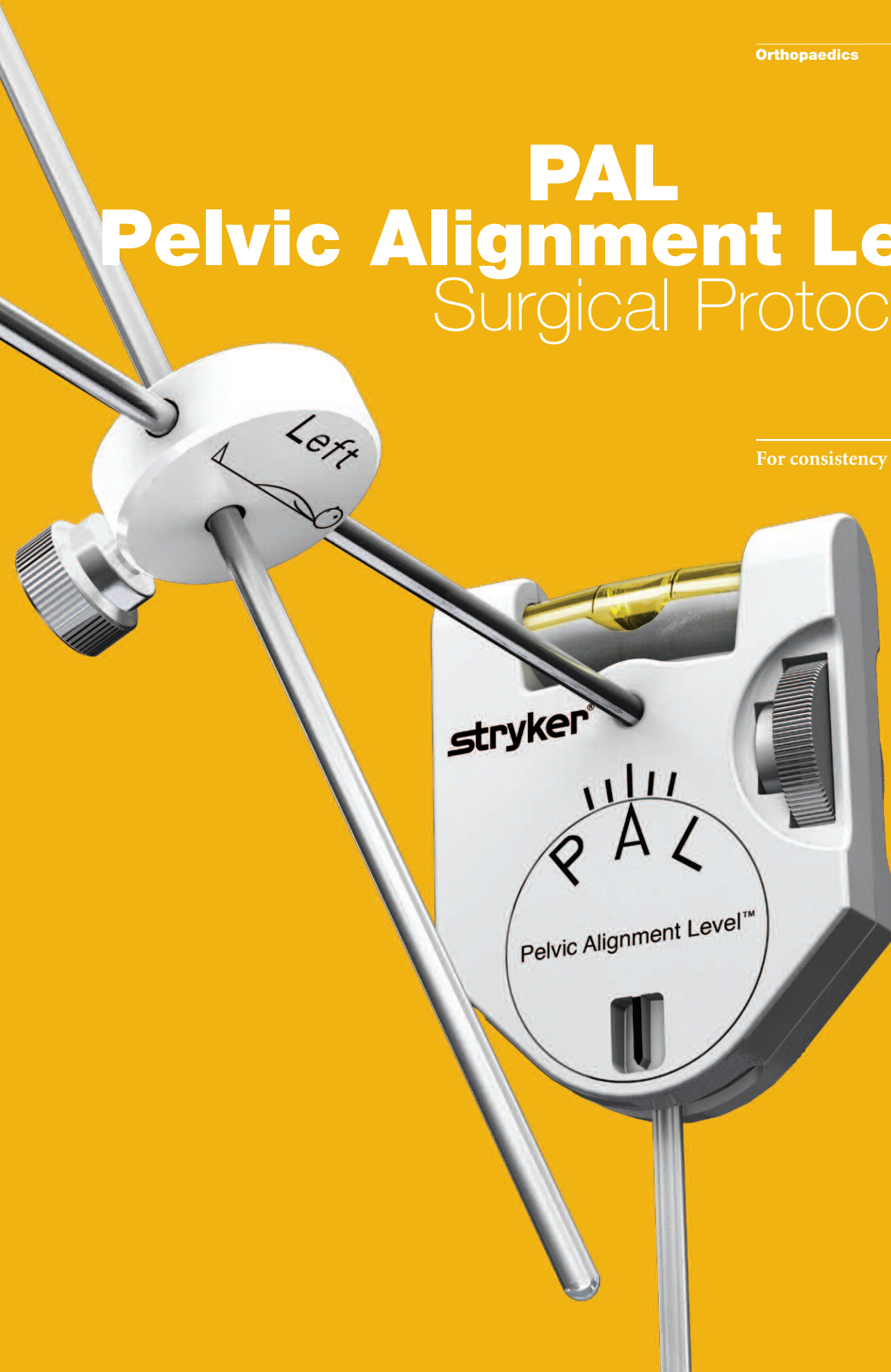


PAL

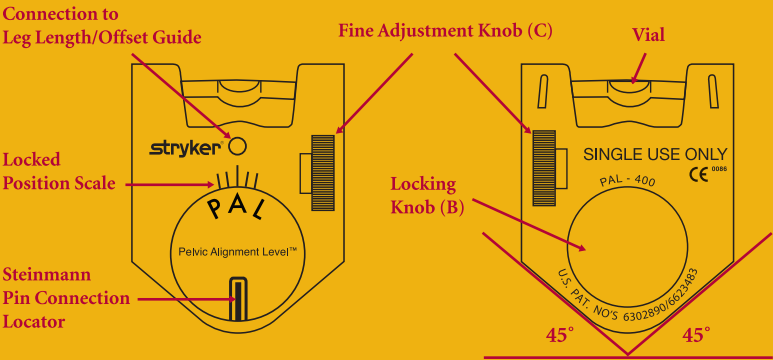
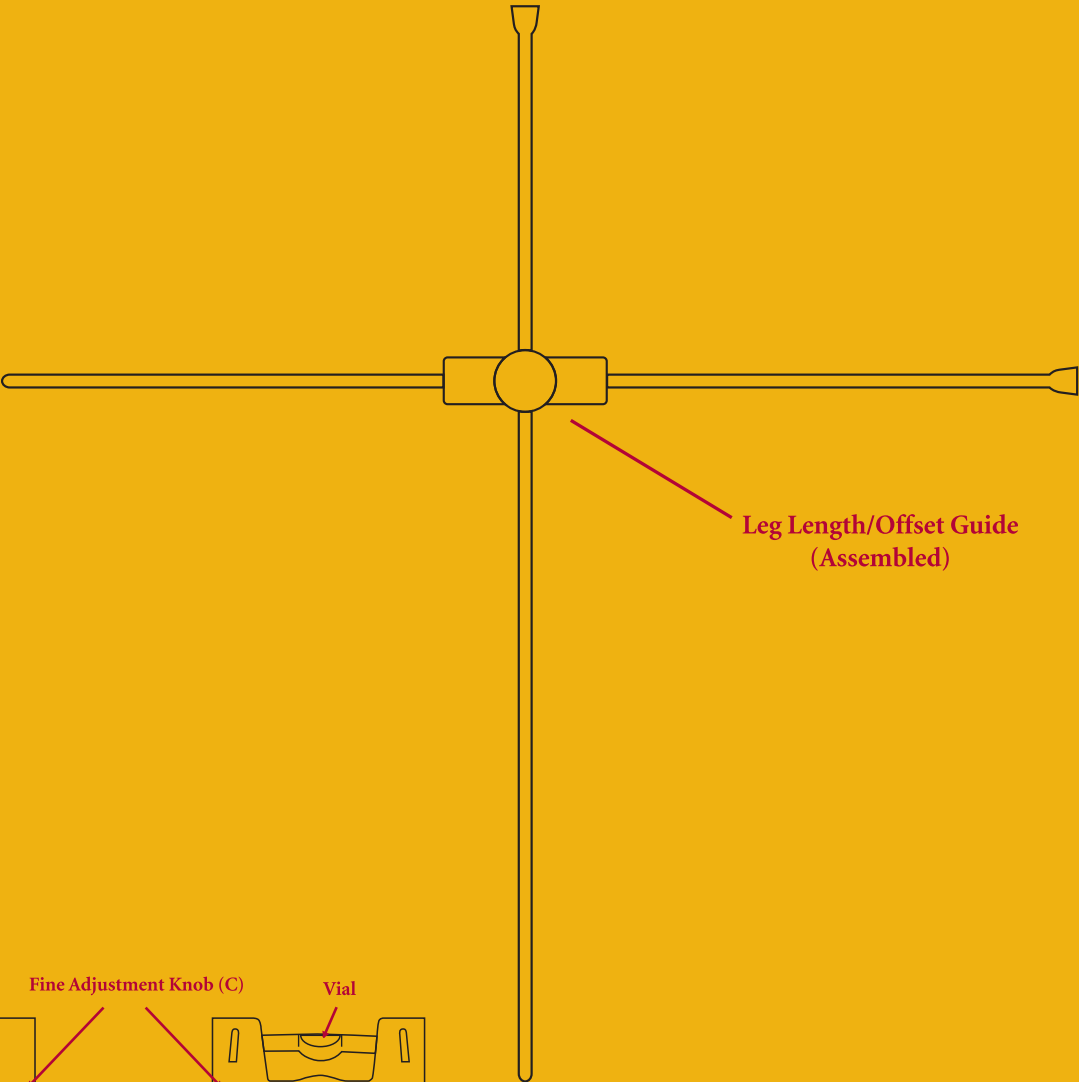
Pelvic Alignment Level

Surgical Protocol

For consistency during surgery



Pelvic Alignment Level (PAL) Features



Pelvic Alignment Level

Surgical Protocol

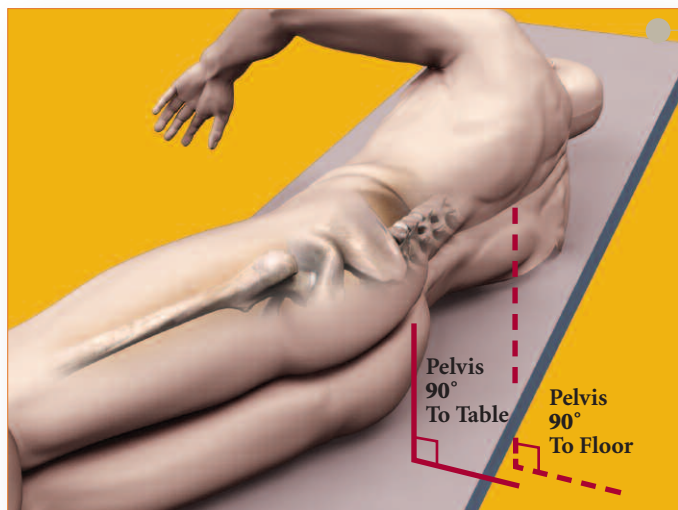


Figure 1

1. Patient Positioning & Preparation

Patient is placed in a lateral decubitus position.

Accurate positioning cannot be over-emphasized. If the patient's position is not true lateral, then the degree of error may be translated into that same degree of acetabular component anteversion error.

The patient is then scrubbed, prepped and draped in the usual fashion.

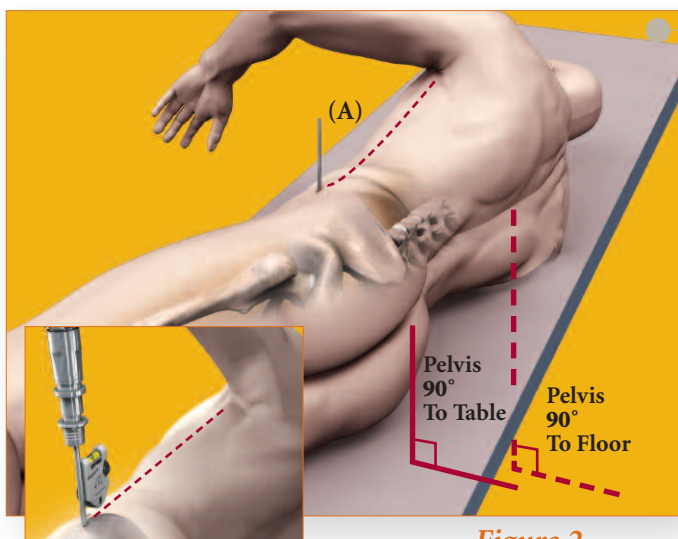


Figure 2

2. Placing the Pin

A small stab wound is made and the short threaded tip Steinmann pin (A) is drilled into the anterior aspect of the iliac crest as close to perpendicular in the coronal plane as possible (Figure 2). The pin should be positioned in a thick part of the iliac crest so that it will remain stable throughout the surgery.

CAUTION: Care should be taken to avoid drilling the pin into the abdominal cavity.

NOTE: Body of PAL can be placed against pin, aligned with the longitudinal axis of patient to improve accuracy of placing pin perpendicular in this plane. (Figure 2A).

Figure 2A

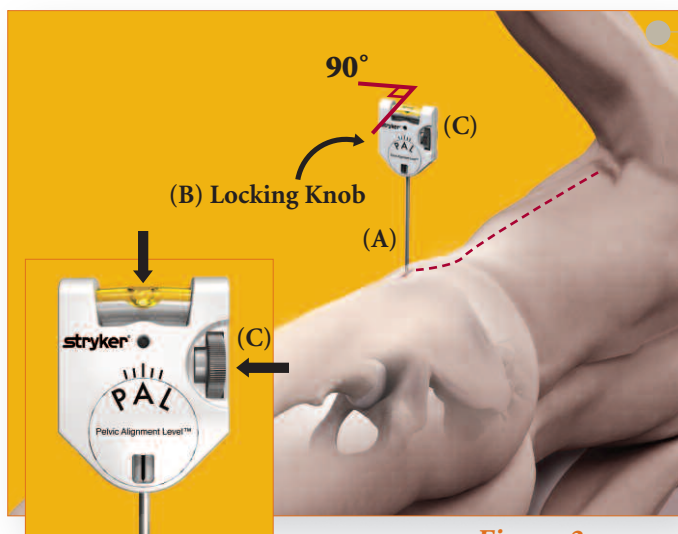


Figure 3

3. Positioning the Pelvic Alignment Level (PAL)

Lightly tighten the locking knob (B) on the PAL (clockwise) and then open (counter-clockwise) one half-turn. Place the PAL on the pin (A) (Figure 3), perpendicular to the long axis of the patient with the locking knob cephalad. Center the bubble by adjusting the fine-tuning knob (C) (Figure 3A). Then firmly tighten the locking knob (B) to lock that position. ***This position will not change throughout the case.*** Remove the PAL from the Steinmann pin and set aside. Proceed with exposure and soft tissue dissection.

NOTE: If multiple bubbles exist in the vial, hold the PAL with the bubble level, vertical to the ground and gently tap so the small bubbles coalesce together forming one.

Figure 3A

Pelvic Alignment Level

Surgical Protocol

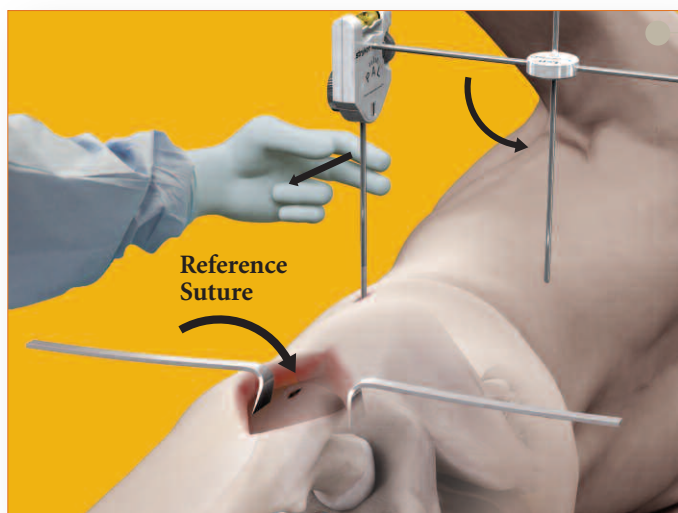


Figure 4

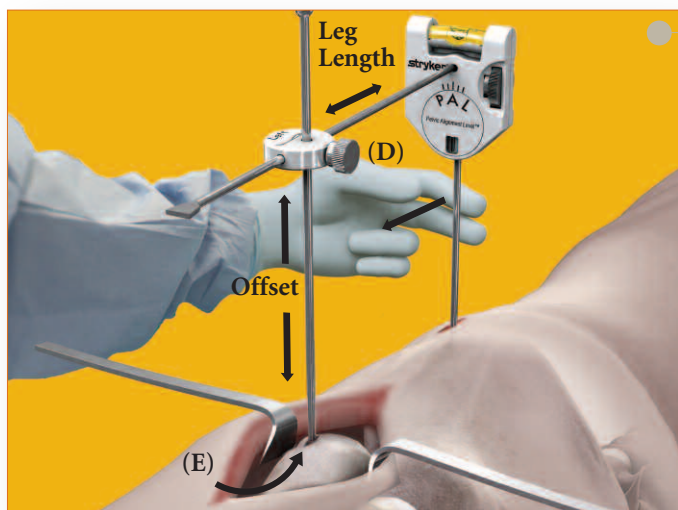


Figure 4A

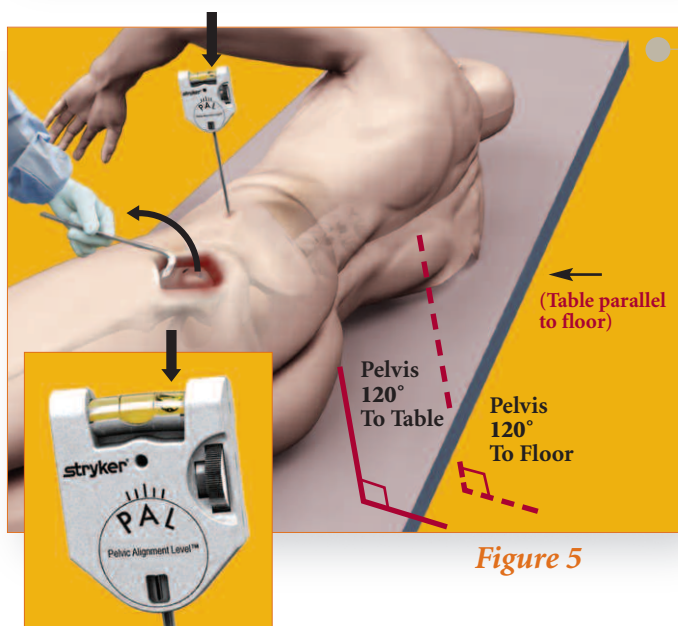


Figure 5

Figure 5A

4. Measuring Leg Length and Femoral Offset

Leg Length and Offset measurements are made once the deep fascia over greater trochanter is exposed.

Important: Position operative leg on “down” leg aligning knees and heels so position can be re-created later in operation.

Important: Make these measurements prior to releasing the short external rotators and hip joint capsule and before the hip is dislocated.

i. First, place a suture into the fascia overlying the greater trochanter as an identifying point (E) for later reference. (Figure 4).

ii. Assemble the LL/Offset guide into the PAL and then place back onto the Steinman pin so the body of PAL is aligned with the longitudinal axis of the patient and the LL/Offset guide is position toward the surgeon (posterior). (Figure 4).

iii. If the bubble is not perfectly positioned in the window, then the assistant surgeon gently pushes on the pin (HINT: not the PAL itself) to center the bubble. (Figure 4).

iv. If pressure is required to center the bubble in the window, then the pressure the assistant surgeon is applying is maintained as the PAL is rotated 90 degrees so the stylus can be adjusted to just touch the suture placed into the fascia overlying the greater trochanter. The thumbscrew (D) is tightened into the disc which “captures” these relationships. (Figure 4A).

5. Acetabular Preparation

Resect the femoral neck and expose the acetabulum.

Place the PAL on the pin perpendicular to the patient prior to acetabular preparation.

Typically, a retractor is placed over the anterior acetabulum and the femur is pulled anterior to expose the acetabulum. This causes the pelvis to roll forward (anterior). (Figure 5 shows an example where the patient has rolled forward 30 degrees from the initial “true” lateral position. Note, at this point the table is still parallel to the floor).

The bubble will no longer be centered (Figure 5A).

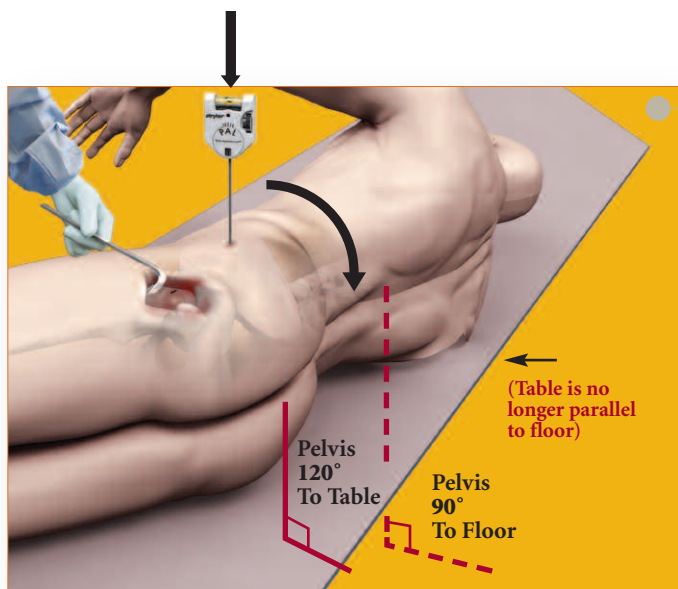


Figure 5B

5. Acetabular Preparation (continued)

To re-center the bubble the table is rotated posterior or towards the surgeon.

The PAL is removed from the Steinmann pin and the acetabulum is prepared.

The PAL can be used to monitor the 45 degree angle of the reamer by placing the 45 degree angle of the PAL housing against any axial segment of the reamer handle (Refer to Figure 6 for placement).

NOTE: The bubble must be re-centered by adjusting the table only. Do NOT attempt to re-adjust the PAL.

NOTE: It is important to remove the PAL from the pin prior to acetabular reaming or impaction in order to maintain the fixation of the pin in the pelvic bone. Movement, or loosening of the pin in the pelvis could potentially compromise the position of the device as originally referenced, which may impact the accuracy of the outcome.

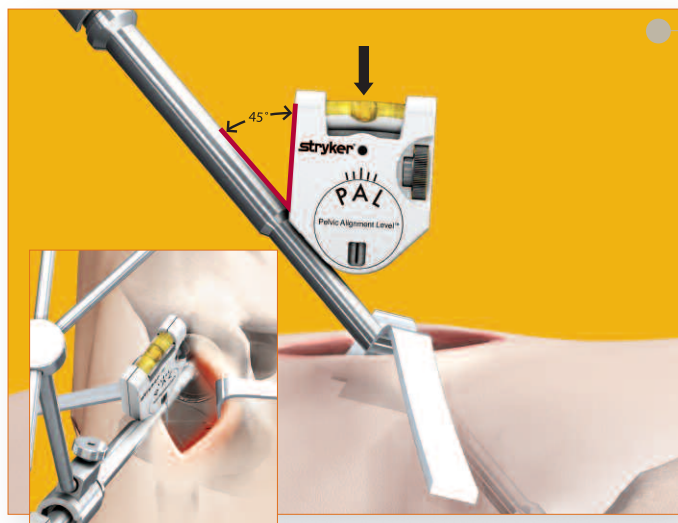


Figure 6A

Figure 6

6. Establishing Acetabular Inclination

Hold the 45-degree angle on the housing of the PAL against the cup impactor aligning the PAL with the axis of the impactor (Figure 6A). When the bubble is centered, the cup will be oriented 45-degrees from the ground. (Figure 6).

Just prior to final acetabular component implantation, place the PAL on the Steinmann pin perpendicular to the patient to confirm that the bubble is centered. If the bubble is no longer centered, the table must be rolled to adjust the bubble back to a centered position in the window. Rolling the table until the bubble is centered in the window will return the pelvis back to the initial “true” lateral position.

NOTE: The bubble must be re-centered by adjusting the table only. Do NOT attempt to re-adjust the PAL.

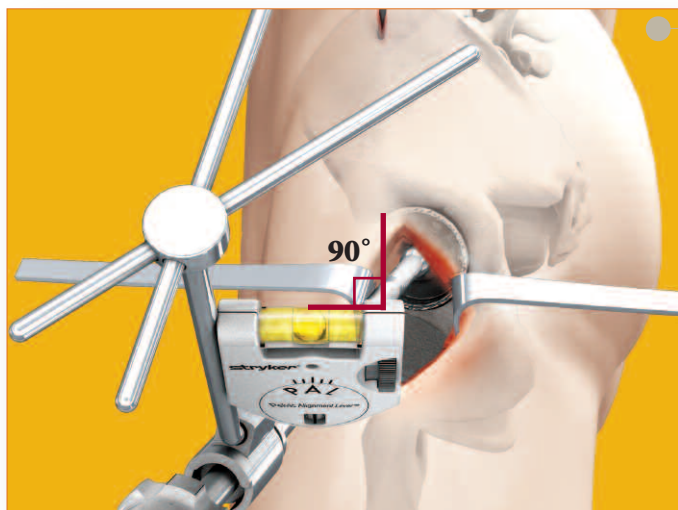


Figure 7

7. Establishing Acetabular Anteversion

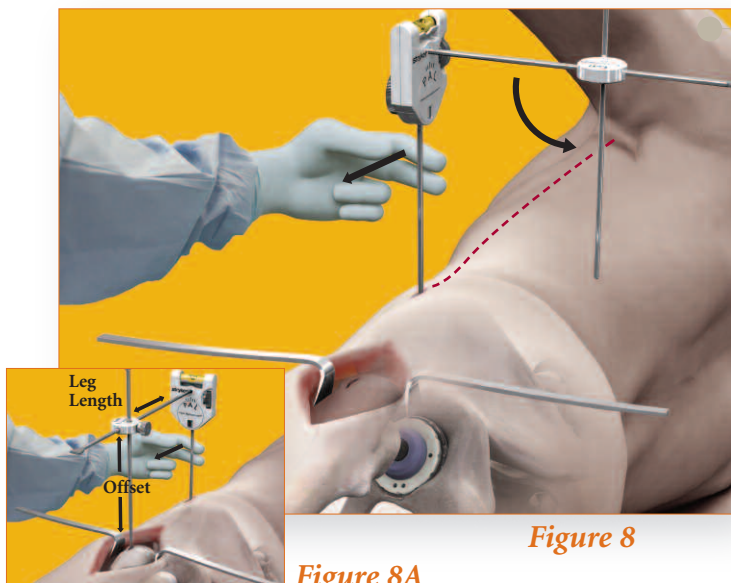
Attach the alignment guide to the cup impactor. Place the body of the PAL against the vertical attachment of the alignment guide perpendicular to the long axis of the patient. Center the bubble to assure that the vertical attachment is perpendicular to the floor. Orient the alignment rod with the longitudinal axis of the patient for desired anteversion.

NOTE: Re-check pelvic rotation, cup inclination angle and anteversion after impaction. Many times the cup “moves” as it encounters sclerotic acetabular bone and must be “worked” into the precise desired position.

NOTE: Proceed with femoral preparation and trialing.

Pelvic Alignment Level

Surgical Protocol



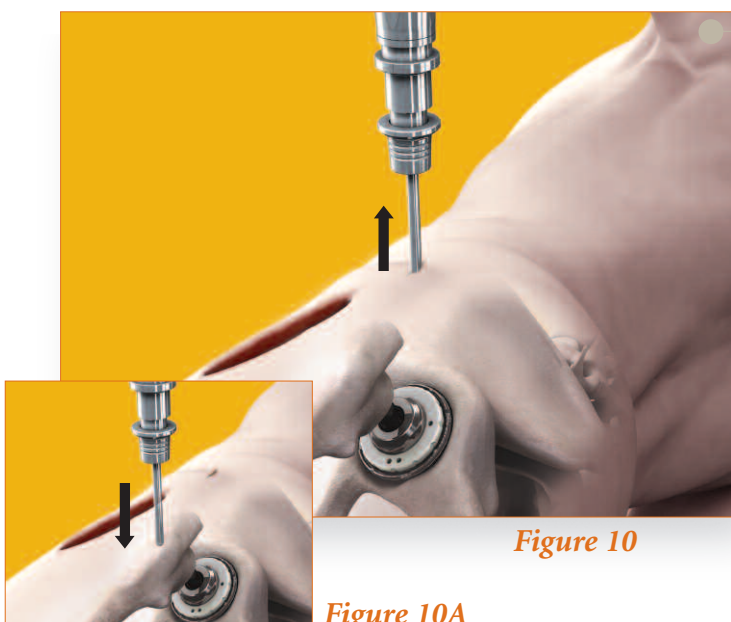
8. Checking Leg Length and Offset

To check LL/Offset with trial components reduced, the operative leg is again aligned with the down leg. Re-insert the LL/Offset guide into the body of the PAL and place on the pin with the body of the PAL aligned with the longitudinal axis of the patient. As necessary the pin is gently pushed to re-center the bubble in the window. (Figure 8). While assistant maintains this pressure on the pin, the PAL is rotated approximately 90 degrees and the stylus is brought as close to the reference suture as possible. Any change in LL or offset is now clearly visualized and the surgeon can decide if those changes are acceptable and desirable. (Figure 8A).



9. Implant Definitive Femoral Components

Repeat protocol as described in step 8 above, but now to assist with final decision regarding femoral head neck length.



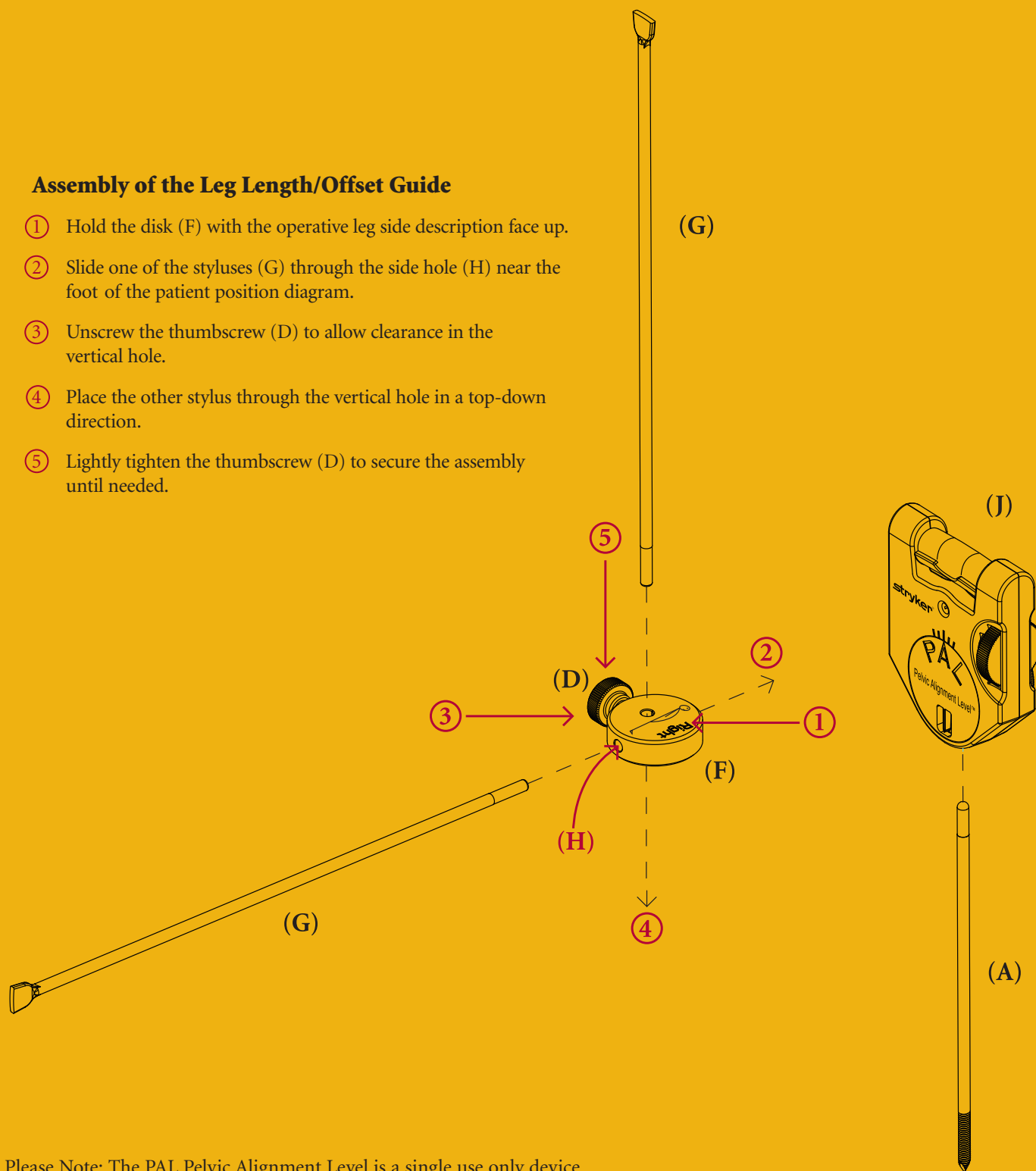
10. Removal

Remove Steinman pin with pin driver on reverse. (Figure 10).

NOTE: The short pin still in the pin driver **on reverse** can be used to drill a small hole in the posterior upper femur to facilitate soft tissue repair. (See Figure 10A).

Assembly of the Leg Length/Offset Guide

- ① Hold the disk (F) with the operative leg side description face up.
- ② Slide one of the styluses (G) through the side hole (H) near the foot of the patient position diagram.
- ③ Unscrew the thumbscrew (D) to allow clearance in the vertical hole.
- ④ Place the other stylus through the vertical hole in a top-down direction.
- ⑤ Lightly tighten the thumbscrew (D) to secure the assembly until needed.



Please Note: The PAL Pelvic Alignment Level is a single use only device.

Pelvic Alignment Level (PAL) Component List

Catalog Number: PAL - 400

ID	Description	Quantity
A	Steinmann Pin	1
F	Leg Length/Offset Guide – Disk with Thumbscrew (D)	1
G	Leg Length/Offset Guide – Stylus	2
J	Level Housing with Locking (B) and Fine Adjustment (C) Knobs	1



Joint Replacements

Trauma, Extremities & Deformities

Craniomaxillofacial

Spine

Biologics

Surgical Products

Neuro & ENT

Interventional Pain

Navigation

Endoscopy

Communications

Imaging

Patient Handling Equipment

EMS Equipment

325 Corporate Drive
Mahwah, NJ 07430
t: 201 831 5000

www.stryker.com

A surgeon must always rely on his or her own professional clinical judgment when deciding to use which products and/or techniques on individual patients. Stryker is not dispensing medical advice and recommends that surgeons be trained in orthopaedic surgeries before performing any surgeries.

The information presented is intended to demonstrate the breadth of Stryker product offerings. Always refer to the package insert, product label and/or user instructions before using any Stryker product. Products may not be available in all markets. Product availability is subject to the regulatory or medical practices that govern individual markets. Please contact your Stryker representative if you have questions about the availability of Stryker products in your area.

Stryker Corporation or its divisions or other corporate affiliated own, use or have applied for the following trademarks or service marks: Stryker. All other trademarks are trademarks of their respective owners or holders.

PAL is a trademark of Leone Innovation Corporation.

Literature Number: **LSP61 Rev. 1**
MS/GS 2.5M 05/08

Copyright © 2008 Stryker
Printed in USA