Introduction:
The Tri-Lock® Bone Preservation Stem (BPS) and its predecessor implant system Tri-Lock® Heritage Stem have been in clinical use since 1981. The worldwide experience with Blade/Tapered stems has validated that this is a technology that can be implanted in patients...male, female, young, old, osteoarthritic, and rheumatoid.1-4 Specific design features of the Tri-lock BPS, such as shorter overall length and contouring of the distal tip, make it very appealing for use in minimal incision techniques such as the Direct Anterior approach.

Patient Overview:
The patient for this study is a 75 year old female who is 5’ 6” tall, weighs 226lbs, and has a BMI of 36.5. She has complained of a several year history of progressive left groin and thigh pain, leg length discrepancy, and poor hip range of motion (ROM). My initial exam demonstrated an obese female with a 5mm leg length discrepancy with the right leg being longer than her left. She presented with an antalgic gait and markedly limited hip ROM in all planes. Her radiographs demonstrated obvious severe degenerative joint disease of the left hip (see Pre-Operative X-Ray).

Methods & Materials:
My approach of choice for the majority of primary total hip replacement (THR) patients is the Direct Anterior Approach, which I perform on a regular operating room (OR) table. Regardless of the approach method that I choose, a titanium tapered or blade style stem is my stem of choice. A broach-only technique provided by the Tri-Lock BPS is routine for all Direct Anterior Approach patients in my practice. Canal reaming is not necessary for blade style stems, nor is it feasible through this approach. The shortened length of the Tri-Lock BPS and contoured distal tip make it especially desirable in cases where exposure may be somewhat compromised, as may be encountered in an obese patient.

Determining whether an obese patient is a candidate for THR through this approach begins at the initial office evaluation. Surgeon experience and training will obviously dictate whether he/she is willing to take on the challenge of these difficult cases. Additionally, obese patients will place high demands on implant components that could result in prosthesis-related complications including failure of the implant. When the surgeon and obese patient decide that hip replacement is the best medical option available, the surgeon must instruct the patient about the possibility of these complications. In addition, the surgeon should instruct the patient to reduce their weight as much as possible before surgery.

Obese patients carry their weight in a variety of ways. Obese males typically demonstrate abdominal obesity that spares the anterior aspect of the thigh. Obese females typically demonstrate adipose distributions that not only include the abdomen but envelope the proximal thigh, buttocks, and peritrochanteric areas. Fortunately, even in the most obese
patient, the proximal anterior thigh/groin region seems to consistently demonstrate the shortest route (in terms of thickness) to the hip joint.

The abdominal pannus, displayed by all of these patients, tends to fold over the inguinal region obscuring vision of the planned incision area. **CRITICAL POINT:** The surgeon must completely undress obese patients on initial exam and completely visualize this area. The surgeon must manually retract the abdominal pannus and inspect the entire intertriginous folds. This area typically may demonstrate skin rashes such as fungal infections, or skin breakdown which will preclude any consideration of surgery in this area. Referral to a dermatologist and patient education regarding hygiene in this area is mandatory. Repeat office visits prior to surgery to demonstrate resolution of this issue is suggested. **NOTE:** Always re-inspect this area in preoperative holding on the day of surgery to ensure this area is free and clear of any fungal infections, or skin breakdown to help prevent against surgical contamination.

The Direct Anterior Approach is performed with the patient in the supine position on a radiolucent OR table. As noted above, the abdominal pannus will consistently lie draped over the planned incision area. Prior to the skin prep, wide adhesive tape can be utilized to ‘pull’ the abdomen towards the opposite side. **NOTE:** To avoid compromising the size of the sterile field, avoid crossing the midline with the adhesive tape retractor.

The Direct Anterior Approach and acetabular preparation in an obese patient is relatively straightforward requiring no special technical modifications. The use of an offset acetabular trial/implant inserter is desirable for **ALL** (obese and non-obese) patients.

The femoral preparation during the Direct Anterior Approach is the most challenging part of the procedure. The goal of the preparation is to elevate the proximal femur enough to allow a relatively straight shot down the canal for broaching and implant insertion. The longer the implant, the greater the exposure must be for insertion. The shorter stature of the Tri-Lock BPS makes it an excellent choice for this approach.

Despite adequate exposure and femoral elevation, the obese abdomen and thigh will continue to make broach and implant insertion difficult. The Tri-Lock BPS dual offset handle makes this step much easier. **NOTE:** The soft tissue bulk may force the surgeon to ‘drag’ the broach out laterally which may compromise the proximal anterior cancellous bone envelope (leg is externally rotated in this position). To avoid this, the surgeon may tap the broach out 1-2cm, disconnect the broach handle, remove the broach with a kocher, replace the next broach by hand, reconnect the broach handle, and complete insertion. Repeat this sequence until final broach is seated.

For some very obese, and more importantly, very muscular patients, femoral elevation is still problematic. The approach may be aided by the use of the OMNI-TRACT™ Femoral Elevator. This device attaches to the side rail of the bed outside of the sterile drapes, when femoral preparation begins.

The post-operative management of the obese patient is identical to the non-obese patient. Immediate full weight bearing without hip precautions is routine. Patients progress off walking aids as desired. Typically, patients progress from walker to cane or nothing within 1-2 weeks of the procedure. Overlap of the abdominal pannus across the surgical wound should be addressed with sterile dressings.

**Results:**

The patient (LE) underwent Direct Anterior left THR utilizing the Tri-Lock BPS on October 21, 2008. The patient was seen for her first post-operative visit on November 26, 2008. The patient noted resolution of all pre-operative hip pain immediately after the procedure. She had utilized a walker for several days after the procedure and switched to a cane which was discarded by 2 weeks post-operatively. Wound staples were removed at 14 days with no wound related issues. During the six week exam the patient demonstrated a slight limp, slight global weakness of hip musculature, but full and pain-free hip motion.

At one year follow-up, this patient is pain free. Her ROM and strength of her left hip is normal. Leg lengths are equal and she has not lost any weight despite returning to normal activity.
Conclusion:
Obviously, the ideal THR candidate is a patient with a normal BMI. Unfortunately, most orthopedic surgeons will be faced with the dilemma of deciding how to treat the severely arthritic hip in the obese, non-ideal surgical candidate. This brief white paper illustrates how the Tri-Lock BPS implant, performed through the direct anterior approach, can help today’s surgeons address hip arthritis in the obese patient.

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Disclosure: Dr. Rockowitz is a surgeon consultant for DePuy Orthopaedics.
Total Hip Prostheses, Self-Centering™ Hip Prostheses and Hemi-Hip Prostheses

**IMPORTANT** This Essential Product Information sheet does not include all of the information necessary for selection and use of a device. Please see full labeling for all necessary information.

**INTENDED USE/INDICATIONS** Total Hip Arthroplasty (THA) is intended to provide increased patient mobility and reduce pain by replacing the damaged hip joint articulation in patients where there is evidence of sufficient sound bone to seat and support the components.

THA IS INDICATED for a severely painful and/or disabled joint from osteoarthritis, traumatic arthritis, rheumatoid arthritis or congenital hip dysplasia; avascular necrosis of the femoral head; acute traumatic fracture of the femoral head or neck; failed previous hip surgery; and certain cases of ankylosis.

Self-Centering Hip Prostheses and Hemi-Hip Prostheses are intended to be used for hemi-hip arthroplasty where there is evidence of a satisfactory natural acetabulum and sufficient femoral bone to seat and support the femoral stem.

**HEMI-HIP ARTHROPLASTY IS INDICATED** in the following conditions: Acute fracture of the femoral head or neck that cannot be reduced and treated with internal fixation; fracture dislocation of the hip that cannot be appropriately reduced and treated with internal fixation; avascular necrosis of the femoral head; non-union of femoral neck fractures; certain high subcapital and femoral neck fractures in the elderly; degenerative arthritis involving only the femoral head in which the acetabulum does not require replacement; and pathology involving only the femoral head/neck and/or proximal femur that can be adequately treated by hemi-hip arthroplasty.

**CONTRAINDICATIONS**

THA and HEMI-HIP ARTHROPLASTY ARE CONTRAINDICATED IN CASES OF: active local or systemic infection; loss of musculature, neuromuscular compromise or vascular deficiency in the affected limb, rendering the procedure unjustifiable; poor bone quality; Charcot’s or Paget’s disease; for hemi-hip arthroplasty – pathological conditions of the acetabulum that preclude the use of the natural acetabulum as an appropriate articular surface. Ceramic heads are contraindicated in revision surgery when the femoral stem is not being replaced or for use with any other than a polyethylene or metal-backed polyethylene cup. In the USA and Canada, ceramic heads are not approved for use with metal inserts.

**WARNINGS AND PRECAUTIONS** Ceramic coated femoral stem prostheses are indicated for uncemented press fit fixation.

**CAUTION: DO NOT USE BONE CEMENT FOR FIXATION OF A CERAMIC COATED PROSTHESIS.**

Components labeled for “Cemented Use Only” are to be implanted only with bone cement. The following conditions tend to adversely affect hip replacement implants: excessive patient weight, high levels of patient activity, likelihood of falls, poor bone stock, metabolic disorders, history of infections, severe deformities leading to impaired fixation or improper positioning, tumors of the supporting bone structures, allergic reactions to materials, tissue reactions, and disabilities of other joints.

**ADVERSE EVENTS** The following are the most frequent adverse events after hip arthroplasty:

- change in position of the components, loosening of components, wear or fracture of components, dislocation, infection, peripheral neuropathies, tissue reaction.

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