One Focus • One System • One Vision
Special challenges face the orthopaedic surgeon performing revision hip surgery. The revision patient often presents with compromised bone stock and lower potential for stable revision implant fixation. The deficiencies that complicate revision surgery must be specifically addressed in order to provide for both long-term mechanical stability and a good functional result.

**One focus**... To provide the best possible clinical outcome, implants must be specifically designed to achieve fixation, restore leg length, provide proper muscle balance, while maintaining or improving bone integrity. The wide variety of revision hip implants from Howmedica Osteonics are designed with these overarching goals first in mind.

**One system**... This booklet details a revision hip portfolio in which implant engineering concepts with long clinical heritage are combined with modern materials and designs. Coupled with familiar and efficient instrument systems, the reconstructive surgeon may choose from an unprecedented array of implant designs, fixation methods, and instrument systems to provide the best clinical outcome possible for patients.

**One vision**... To provide the most comprehensive, best-in-class revision hip portfolio with total, one-source coverage for all femoral and acetabular revision classifications.
TYPE I
Some expansion of the metaphysis may exist; however, the calcar and metaphysis are intact. The isthmus is undamaged.

Restoration™ HA
Restoration™ PS
Restoration™ PS
TYPE II

The metaphysis is compromised and may have anatomic deficiencies, or available bone may be thin, sclerotic, and poorly capable of support. The diaphysis is preserved.

Restoration™ HA  
Restoration™ PS  
Restoration™ C
TYPE III

Extensive metaphyseal and diaphyseal bone loss and damage. A Type III femur has no calcar, a non-supportive metaphysis, and the diaphysis is not intact.

Restoration™ HA

Restoration™ PS

Restoration™ T3
Restoration™ HA is a titanium, fully coated revision hip system. Designed for use in a wide range of revision cases, Restoration™ HA provides excellent mechanical stability through a roughened surface treatment and PureFix™ HA hydroxylapatite coating.
The Restoration™ HA system includes 6” and 8” straight and 8” bowed femoral components for Type I, Type II, and some Type III revisions, and 10” bowed components for cases where extensive bone loss requires greater length for fixation. Two calcar replacement levels (15 and 30mm) are available for proximal reconstruction when the calcar is absent. The Restoration™ HA system features a two-for-one distal to proximal sizing option, illustrated below. This allows the surgeon four proximal implant choices within 1mm of distal reaming – enabling optimal loading of available proximal bone while achieving good distal fixation.

The proximal geometry of Restoration™ HA draws on a 12-year heritage of excellent clinical results with the Howmedica Osteonics® Omnifit® HA geometry used in both primary and revision cases.

In order to preserve the high fatigue strength of the flexible, biocompatible titanium substrate, the surface is chemically roughened in a patented process and then coated with PureFix™ HA, which is produced and applied in-house.
Taking advantage of long clinical experience with distally fixed implants while making use of modern technology to enhance load transfer into the femur was the primary design goal of the Restoration™ PS hip system. Restoration™ PS is a forged titanium, plasma sprayed implant designed for a variety of primary and revision applications.
The unique geometry of the Restoration™ PS Femoral Component includes a distal cylindrical portion for diaphyseal fixation, a middle conical portion to enhance load transfer, and an anthropometric shaped proximal segment to enhance rotational stability.

Titanium porous plasma spray coating provides a roughened surface for increased torsional and axial stability while at the same time preserving the fatigue strength of the implant.

The Restoration™ PS system includes 6” and 8” straight and 8” bowed femoral components for Type I, Type II, and some Type III revisions. Slotted and fully coated 10” bowed components are available for cases where extensive bone loss requires longer implant length for fixation.

Designed with the same two-for-one distal to proximal sizing option featured in the Restoration™ HA implants, there are four proximal body sizes within 1mm of reaming. Between the HA and PS stems, an unprecedented array of options – lengths, coatings, diameters, and proximal sizes – are available to the revision surgeon.

**Implant Distal Size Options (Straight Stems)**

**Proximal Stem**

**Distal Size Options (mm) Per Stem**

BULLET DISTAL TIP

DISTAL OFFSET SLOT
Restoration™ T3 is a modular, titanium revision system designed specifically to address the complex circumstances of severe Type II and Type III revision surgeries. The two-piece modular stem design consists of a proximal body designed to restore leg length and a distal stem designed to lock firmly into the distal femur.
The distal component of the T3 is based on the Wagner design philosophy – a heavily grit-blasted, fluted conical section – with a long clinical history. This geometry is designed to provide immediate axial and torsional stability.

The modular proximal portion of the stem, however, addresses the frequent difficulty in severe revision cases of properly restoring leg length and hip joint mechanics. Through the series of increasingly higher proximal bodies supplied, leg length can be equalized and proper offset restored. The two-piece modular design allows version control for maximum joint stability.

A variety of stem lengths, diameters, and proximal bodies enables the surgeon to determine the size required to provide immediate mechanical stability. The instrument system is specifically designed for accurate implantation of the stem and provides visual depth references for accurate joint center restoration. This is especially important in Type III cases, where proximal landmarks may be unavailable.

**STEM DIAMETERS**

- 24mm
- 22mm
- 20mm
- 19mm
- 18mm
- 17mm
- 16mm
- 15mm
- 14mm
The Exeter™ Hip is based on a unique, collarless, highly polished, double tapered femoral component design. This design reduces shear stresses at the cement/implant interface and allows radial compression of the cement mantle. This design philosophy, introduced in 1970, continues to provide excellent clinical results.

The Exeter™ Hip, used with morselized cancellous bone graft and the patented impaction grafting technique allows implantation of the stem into a neomedullary canal of compacted cancellous allograft shaped by cannulated tamps passed over a centralizing rod. This centralizing rod helps to ensure that the graft is distributed properly in the femur in order to be optimally loaded by the tapered stem geometry.
**Exeter™ Long Stems**

The Exeter™ Long Stem is used in cases where the surgeon desires to perform impaction grafting. It is also used in cases with severe distal lysis or bone stock deficiencies beyond the tip of a standard length Exeter™ implant.

Two types of Exeter™ Long Stems are offered. The first type is a 205mm long Tapered Stem. The second type has a cylindrical extension to bypass distal defects; this stem is available in 200, 220, 240, and 260mm lengths.

The X-change™ Revision Instrument System may be used with the full range of Long Stems. The instrumentation builds on the basic impaction grafting techniques widely used with the Exeter™ stem.
X-Change™ Revision Mesh

The X-change™ Revision Mesh system is a complete offering of stainless steel meshes that allow the surgeon to effectively contain graft in either the acetabulum or femur during revision procedures.

All the mesh implant shapes are preformed and intended for immediate reinforcement and defect reconstruction. The flat mesh can be formed as appropriate during surgery. Each can be cut and formed to meet individual anatomy requirements using specially designed cutting and bending instruments.

The specially designed petal shape of the Medial Wall Mesh can be used to help repair defects and act as constraint for graft. Individual petals can be removed as necessary.

The Rim Mesh is used to provide support on the rim of the acetabulum and can be secured in place using the self-drilling, self-tapping screws.

The Femoral Mesh has been designed to enable the surgeon to add additional reinforcement to the femur prior to impaction grafting or broaching.

The Flat Mesh can be used in any application where bone quality is suspect and where additional strengthening, support, or graft containment is indicated.

A Femoral Anatomic Mesh has been designed based on surgeon feedback to assist the buildup of the calcar region. It is shaped and fluted to support the proximal femur.
A unique system of instruments for the revision of femoral components due to severe bone loss, the X-change™ instruments offer a method of recreating implant stability and function. Clinical experience to date suggests that implant stability is routinely achievable with impressive restoration of bone stock.

The X-change™ Revision Instruments System produces a “neomedullary canal” lined with firmly impacted cancellous allograft chips, and is designed for use with the Exeter™ implant, a clinically established prosthesis introduced in 1970. Correct use of the X-change™ instruments with impaction grafting will tailor the femur and acetabulum to accept a routinely used size of Exeter™ femoral component and acetabular cup.

Histological evidence from postmortem studies in patients who have undergone the procedure suggest that a high proportion of the impacted graft is replaced by living host bone with direct contact between healthy bone and the cement, without the interposition of a soft tissue membrane.
The Howmedica Osteonics® Omnifit® Cemented Long Stem is an excellent approach to cemented revisions, fracture non-unions, failure of internal fixation devices, and oncology surgery.

The Cemented Long Stem system contains the core, time-tested features of the Howmedica Osteonics® Omnifit® primary stem design. These features include proportional sizing, a dual wedge proximal geometry, and normalizations.

Cemented Long Stem indications include cemented revisions, fracture non-unions, failure of internal fixation devices, and oncology surgery.

The system features a variety of lengths, from 200-350mm, and also provides a wide variety of proximal sizes and neck lengths to achieve proper patient biomechanics.
The Cemented Head/Neck Long Stem System complements the cemented long stem offering. These implants are designed to address femurs with deficient calcars and fracture non-unions.

The Head/Neck stem's unique configuration is designed to resist torsional stresses generally associated with low resection levels on the femur. The lateral flange and wire holes on the stems aid in stabilizing the greater trochanter and may help in its reattachment if necessary.

Torsional stability is enhanced by means of the increased medial flare under the platform and longitudinal grooves on the anterior and posterior aspects of the stem.
Useful in Type II/III revision cases, Restoration™ C is a system of implants and instruments designed to be used with the morselized cancellous allograft impaction grafting technique.

The geometry of the Restoration™ C implant is based on the Howmedica Osteonics® Omnifit® C geometry, with over 13 years of clinical success in cemented use. The eccentric tapered, dual wedge geometry of the Restoration™ C stem optimally loads allograft in compression, which has been determined to maximize chances for incorporation.

A patented set of instruments paired with the Restoration™ C implants allows easy, reproducible creation of a neomedullary canal of cancellous allograft. The graft delivery system can be prepared in advance by the OR staff while the surgeon is removing the existing implant, and then may be used to rapidly deliver the graft into the femur. Tamping instruments then shape the graft and allow accurate control over cement interdigitation.
The Gray™ Revision Instruments simplify removal of implants and cement to facilitate revision surgery.

**Instruments for Cemented Stem Revisions**

Long cement removal osteotomes and hooks are provided to allow access to the distal canal for cement and membrane removal. Cement taps and cannulated end mills are available in two lengths for removal of distal cement.

**Instruments for Cementless Stem Revisions**

Flexible osteotomes in various sizes can be inserted between the femur and implant to interrupt fixation. The unique design guides the cutting edge towards the implant and away from the bone. They are available in a variety of lengths and widths, each with a hardened stainless steel cutting tip.

**Instruments for Acetabular Revisions**

Curved osteotomes aid in the removal of cemented and cementless acetabular components. These instruments are designed to follow the contour of the cup, loosening the implant while protecting against damage to the acetabular rim and wall. Acetabular liner sectioning instruments allow a wedge of plastic to be removed to disrupt component fixation and facilitate removal.
A particular challenge in acetabular revision cases with severely deficient bone stock is achieving stable and lasting fixation. The Restoration™ GAP (Graft Augmentation Prosthesis) series of acetabular revision implants are specifically designed to be a comprehensive solution to the challenges of acetabular revision.

The Restoration™ GAP system addresses complex acetabular reconstruction with morselized graft through immobilization and proper compressive loading, the two mechanical factors influencing the integration of morselized bone graft into the host bone.

The GAP Ring device is a titanium reinforcement ring intended for less severe acetabular reconstruction when the rim is intact. The GAP II second-generation acetabular revision cage provides a forged titanium shell with inferior hook, superior plates, and multiple cluster screw holes for ilium and ischium fixation. Each GAP device is supported with host bone and compacted morselized allograft or structural allograft, being fixed in place with bone screws; a variety of liners may then be cemented into place. This allows the surgeon to place the liner to achieve maximum stability.
Revision Cup Options

Constrained Acetabular Insert

Designed for primary and revision hip patients who are at high risk of hip dislocation due to a history of prior dislocation, bone loss, joint or soft tissue laxity, neuromuscular disease, or intraoperative instability, the Constrained Acetabular Insert is used in conjunction with a standard Howmedica Osteonics femoral head.

The Constrained Acetabular Insert contains a Howmedica Osteonics® UHR® bipolar which is constrained within the insert and, in turn, securely captures the femoral head.

A unique, patented split-ring locking mechanism facilitates ease of femoral head assembly, yet provides enhanced security against component disassembly, while a head removal key allows for easy, atraumatic disassembly. Articulation occurs at both the head-to-bipolar interface and at the bipolar-to-insert interface.

Secur-Fit™ HA XTRA Acetabular Shells

To address complex primary and revision applications, Secur-Fit™ HA XTRA Acetabular Shells are available.

The Secur-Fit™ HA XTRA addresses issues associated with medialized acetabular defects without compromising shell placement. Six peripheral screw holes accept 4.5mm cancellous bone screws and are distributed circumferentially around the shell rim allowing access to supporting host bone in either the anterior or posterior columns. The dome screw hole style offers the option of additional screw placement into host or bone graft. Five superiorly placed screw holes are arranged in a cluster pattern, and two inferiorly placed screw holes allow access to the ischium based on left and right orientation.

Eccentric Liner

For cases of joint laxity, the eccentric liner device is available. This shell insert lateralizes the femoral head by 6mm for increased offset and joint stability. It is an excellent option for revisions involving joint laxity without a shell exchange.

Used to help restore the normal head offset in cases of joint instability due to insufficient offset, eccentric inserts allow femoral lateralization without using a skirted femoral head.

Eccentric inserts offset the femoral head center, providing the surgeon an additional option when joint stability is a concern, and also provide substantially increased polyethylene thickness. Eccentric inserts are available for System 12® and Series II shells.
In 1985, the world’s first multi-filament orthopaedic cable, Dall-Miles™ was introduced by Howmedica Osteonics as a means of providing superior fixation over monofilament wire for trochanteric reattachment procedures.

Today, with more than 100 published clinical papers demonstrating clinical successes, the Dall-Miles™ Cable System continues to set the clinical standard in cable fixation. No other multi-filament cable system offers the reassurance of so much clinical experience and proof-in-use.

The system offers a wide array of implant options to address the unpredictable needs of reconstructive and trauma surgeons alike, including a variety of cerclage and trochanteric reattachment applications.

Key indications provide intraoperative versatility in the areas of Reconstruction, Trauma, and Spine.
Instruments…
*The Backbone of the Cable System*

Unmatched in precision and quality, the dedicated instruments for trochanteric reattachment and cerclage have been masterfully designed for:

- Surgeon comfort
- Ease-of-use for reduced operating room time
- Simplified case/tray layout for surgical staff organization

**DOUBLE SIDED TENSIONER**

**SINGLE SIDED TENSIONER**

**CRIMP TOOL**

**CABLE CUTTER**