Design Philosophy

Cementless Stems of 12/14 Taper

Cat. No	Stem Length	Neck shaft Angle
STEM-N3	123 mm	132˚
STEM-N4	125 mm	
STEM-N5	130 mm	
STEM-N6	135 mm	
STEM-N7	140 mm	
STEM-N8	145 mm	
STEM-N9	150 mm	

Cement Polished Tapered Stems of 12/14 Taper

Cat. No	Stem Length	Neck shaft Angle
STEM-CL3	96 mm	132˚
STEM-CL4	98 mm	
STEM-CL5	104 mm	
STEM-CL6	110 mm	
STEM-CL7	116 mm	
STEM-CL8	122 mm	
STEM-CL9	128 mm	

Cement Collared Stems of 12/14 Taper

Cat. No	Stem Length	Neck shaft Angle
STEM-CC3	96 mm	132˚
STEM-CC4	98 mm	
STEM-CC5	104 mm	
STEM-CC6	110 mm	
STEM-CC7	116 mm	
STEM-CC8	122 mm	
STEM-CC9	128 mm	

Metal Femoral Head

Cat. No	Outer Diameter	Description
MH-221214S	22 mm	short neck -3.5
MH-221214M	22 mm	medium neck 0
MH-221214L	22 mm	long neck +3.5
MH-281214S	28 mm	short neck -3.5
MH-281214M	28 mm	medium neck 0
MH-281214L	28 mm	long neck +3.5

Ceramic Femoral Head

Cat. No	Outer Diameter	Description
CH-281214S	28 mm	short neck -3.5
CH-281214M	28 mm	medium neck 0
CH-281214L	28 mm	long neck +3.5
CH-321214S	32 mm	short neck -4
CH-321214M	32 mm	medium neck 0
CH-321214L	32 mm	long neck +4

Cancellous Bone Screw

Cat. No	Length
S-15	15 mm
S-20	20 mm
S-25	25 mm
S-30	30 mm
S-35	35 mm
S-40	40 mm
S-45	45 mm
S-50	50 mm
S-55	55 mm
S-60	60 mm

Acetabular Cup UHMW Polyethylene insert

Cat. No	Outer Diameter	Cat. No	Outer Diameter
AC-42	42 mm	AC-54	54 mm
AC-44	44 mm	AC-56	56 mm
AC-46	46 mm	AC-58	58 mm
AC-48	48 mm	AC-60	60 mm
AC-50	50 mm	AC-62	62 mm
AC-52	52 mm		

Acetabular Cups Ceramic insert

Cat. No	Outer Diameter	Cat. No	Outer Diameter
AC-CL-44	44 mm	AC-CL-56	56 mm
AC-CL-46	46 mm	AC-CL-58	58 mm
AC-CL-48	48 mm	AC-CL-60	60 mm
AC-CL-50	50 mm	AC-CL-62	62 mm
AC-CL-52	52 mm		
AC-CL-54	54 mm		

UHMW Polyethylene liner / Flat type

Cat. No	Use Acetabular Cup	Inner
ALF-22-4244	42 mm ~ 44 mm	Ø 22 mm
ALF-22-4648	46 mm ~ 48 mm	Ø 22 mm
ALF-22-5052	50 mm ~ 52 mm	Ø 22 mm
ALF-28-4244	42 mm ~ 44 mm	Ø 28 mm
ALF-28-4648	46 mm ~ 48 mm	Ø 28 mm
ALF-28-5052	50 mm ~ 52 mm	Ø 28 mm
ALF-28-5456	54 mm ~ 56 mm	Ø 28 mm
ALF-28-5860	58 mm ~ 60 mm	Ø 28 mm

UHMW Polyethylene liner / 10˚ Elevated type

Cat. No	Use Acetabular Cup	Inner
ALE-22-4244	42 mm ~ 44 mm	Ø 22 mm
ALE-22-4648	46 mm ~ 48 mm	Ø 22 mm
ALE-22-5052	50 mm ~ 52 mm	Ø 22 mm
ALE-28-4244	42 mm ~ 44 mm	Ø 28 mm
ALE-28-4648	46 mm ~ 48 mm	Ø 28 mm
ALE-28-5052	50 mm ~ 52 mm	Ø 28 mm
ALE-28-5456	54 mm ~ 56 mm	Ø 28 mm
ALE-28-5860	58 mm ~ 60 mm	Ø 28 mm

Ceramic liner

Cat. No	Use Acetabular Cup	Inner
CL-28/37G	44 mm ~ 50 mm	Ø 28 mm
CL-32/41G	52 mm ~ 56 mm	Ø 32 mm
CL-32/44G	58 mm ~ 62 mm	Ø 32 mm

Bipolar Cup

Cat. No	Outer Diameter	Cat. No	Outer Diameter
BC-42	42 mm	BC-49	49 mm
BC-43	43 mm	BC-50	50 mm
BC-44	44 mm	BC-51	51 mm
BC-45	45 mm	BC-52	52 mm
BC-46	46 mm	BC-53	53 mm
BC-47	47 mm	BC-54	54 mm
BC-48	48 mm	BC-55	55 mm

Bipolar liner

Cat. No	Use Bipolar Cup	Inner
BL-2237	42 mm	Ø 22 mm
BL-2239 / BL-2839	43 mm ~ 44 mm	Ø 22 mm / Ø 28 mm
BL-2241 / BL-2841	45 mm ~ 46 mm	
BL-2243 / BL-2843	47 mm ~ 48 mm	
BL-2245 / BL-2845	49 mm ~ 50 mm	
BL-2847	51 mm ~ 52 mm	Ø 28 mm
BL-2849	53 mm ~ 54 mm	

OTIS Biotech

Factory : 2-Ba #514 Shihwa Industrial Complex, Jeongwang-dong, Siheung-si, Gyeonggi-do, Korea
Tel : +82 31 319 0406~7 **Fax :** +82 31 319 0414
Seoul Office : #501 STX V-Tower, 371-37 Gasan-dong, Geumcheon-gu, Seoul, Korea
Tel : +82 2 811 3571 **Fax :** +82 2 811 3572

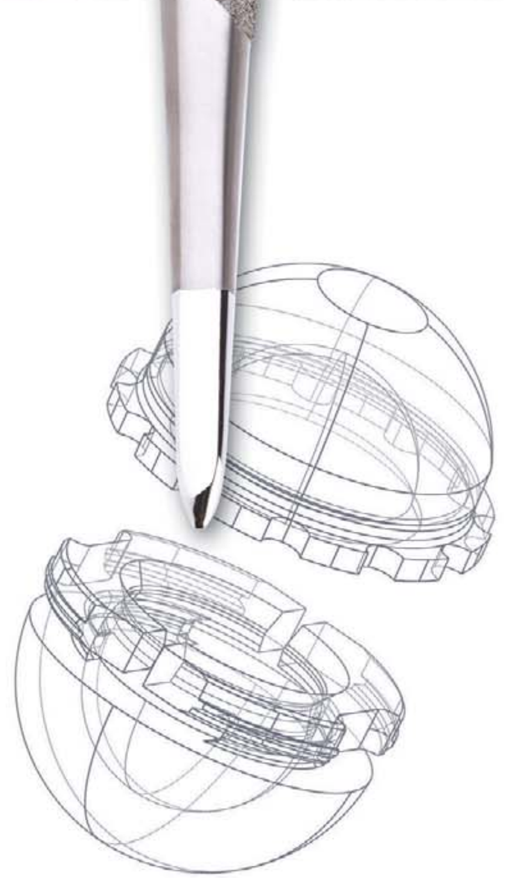
Better Life
Better Technology

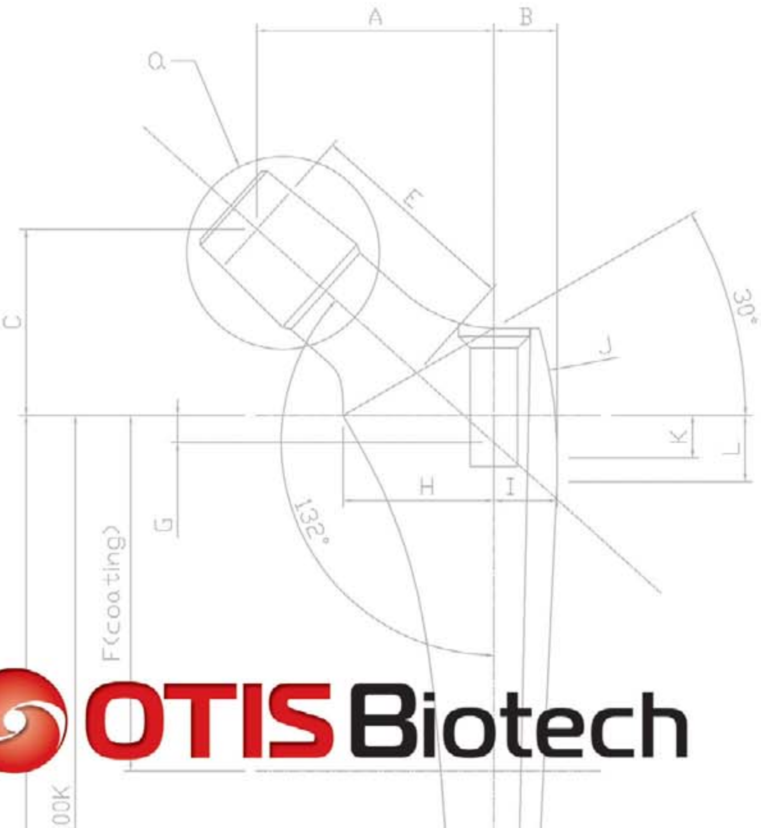
www.otisbiotech.com

Design Philosophy

MultiFit™

Total Hip System





OTIS Biotech

Design Philosophy

MultiFit™

Total Hip System

The dramatic success of total hip arthroplasty over the 30 years means that total hip replacement became common popular operation easily approacheable to average orthopaedic surgeons.
Every years approximately one million of patients are expected to perform total hip replacement throughout the world.
The design features of MultiFit™ Total Hip System has its foundation in critical anatomical assessment, clinico-surgical experience and optimizing bioengineering research and development for a recent 10 years.

Cementless Tapered Stem

Cement Polished Tapered Stem

Cement Collared Stem

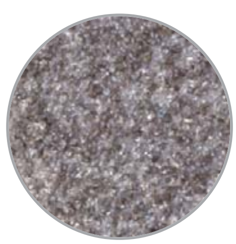
Acetabular System

Bipolar System

Cementless Tapered Stem

The overall design conception was line to line figure. Due to porous and plasma coated area having 0.5~0.8mm thickness and overall taper stem configuration, the compression stress and hoop stress are efficiently increased during press fit maneuver which results in added stability and fixability with the host bone.

Porous coated



Plasma spray

The noncemented stem is composed of Ti-6A1-4V ELI biomaterial with sound biomechanically designed neck shaft angle fomulating 132 degrees. It is also design to have anatomical medial curve within the neck.

The connecting taper to ball head has clinically proven 12/14 taper.
This enables both metal taper and ceramic head to fit with more stable configuration.

The stem dur to its cross section of the neck geometry being optimized track formation achieves maximum range of motion.

The proximal cross section was designed to have optimal rotational stability.

The proximal portion was coated with porous surface area for sound bony ingrowth, whereas the distal portion is coated with sand-blasting making good bony ongrowth.

The shapes of the distal part of stem is kept rectangular and relatively slender and distal tip of the stem has polished surface with bullet configuration reducing the friction with the cortex and leading more smooth and safe insertion of the stem.

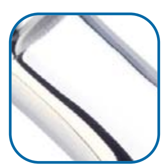
Introduction

A multiple clinical studies has been showing that titanium tapered stem result in less thigh pain and stress shielding. However, stiff stem that is figidly fixed in this distal one third inevitably lead to proximal stress shielding and thigh pain.
The biomechanical concepts of the MultiFit™ cementless titanium stem is characterized by the proximal load transfer, which result in decreased stress shielding and less thigh pain and excellent rotational stability.

Cement Polished Tapered Stem

Tapered polished MultiFit™ cemented stem designed to decrease stress shielding of proximal femur and to increase rotational stability with comparative assessment by Finite Element Analysis.

The cement stem is composed of Co-Cr alloy with sound biomechanically designed neck shaft angle formulating 132 degrees. It is also designed to have anatomical medial curve within the neck.



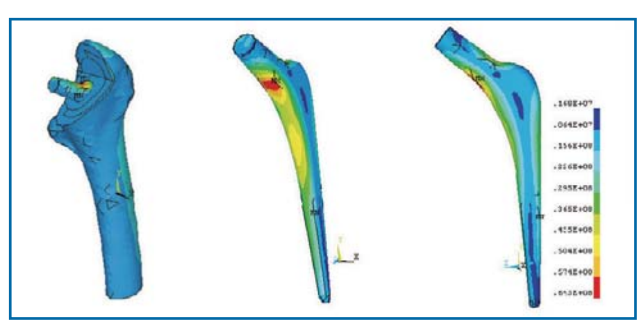
The stem due to its cross section of the neck geometry being track formation achieves maximum range of motion.

The cement collarless stem has overall highly polished surface that minimizes friction between the stem surface and cement. Also the triple taper, which is wedge shape, reduces shear stress while increasing the compress stress and tensile hoop stress. This provides reduction in stress shielding and subsidence and promote rotation stability with excellent self-locking taper.

Introduction

The low frictional charnley® hip stem developed by *Sir John charnley* has set the gold standard for the cemented total hip arthroplasty.

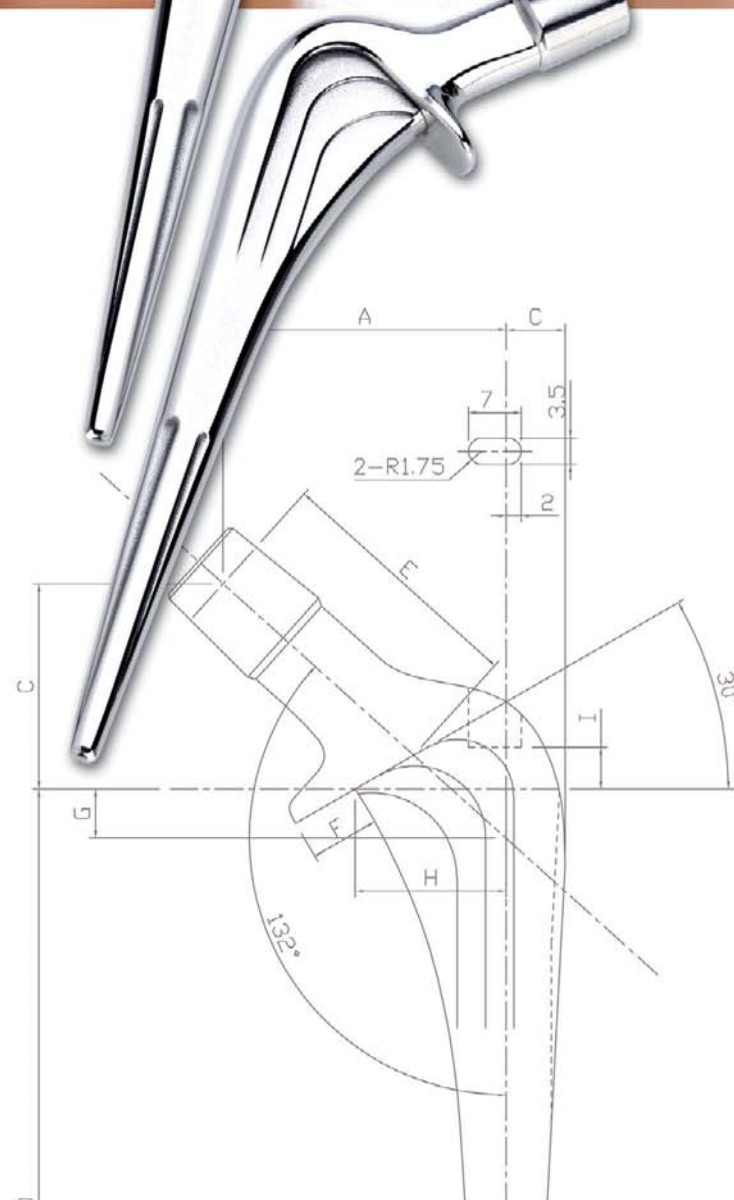
MultiFit™ polished tapered stem has been designed to build on this experience and comparative assessment of conventional cemented designs by detailed finite element analysis.
With the MultiFit™ cementless tapered stem, OTIS biotech has offered this successful concepts of design variables and wide range of size, while incorporating additive design characteristics to further enhance clinical performance of implants.
The MultiFit™ collared cemented stem has been designed to build on the sound design principle of *Sir John charnley* low-friction torque arthroplasty and extensive arthropometric studies.



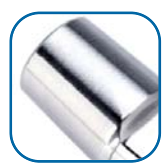
Finite Element Analysis

Cement Collared Stem

The cement collared taper, which is wedge shape, reduces shear stress while increasing the compress stress and tensile hoop stress.
This provides reduction in subsidence and promote rotation stability with excellent self-locking taper.



The noncemented stem is composed of Ti-6A1-4V ELI biomaterial with sound biomechanically designed neck shaft angle fomulating 132 degrees. It is also design to have anatomical medial curve within the neck.



The connecting taper to ball head has clinically proven 12/14 taper.
This enables both metal taper and ceramic head to fit with more stable configuration.

Proximal textured surface increase strength of cement-stem interface

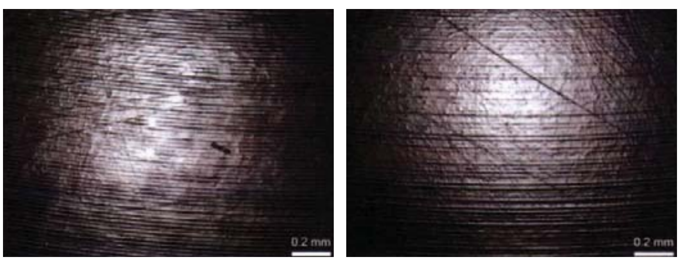
Grit blasted satin surface finish in entire stem shaft

Distal flutes increase rotational stability.

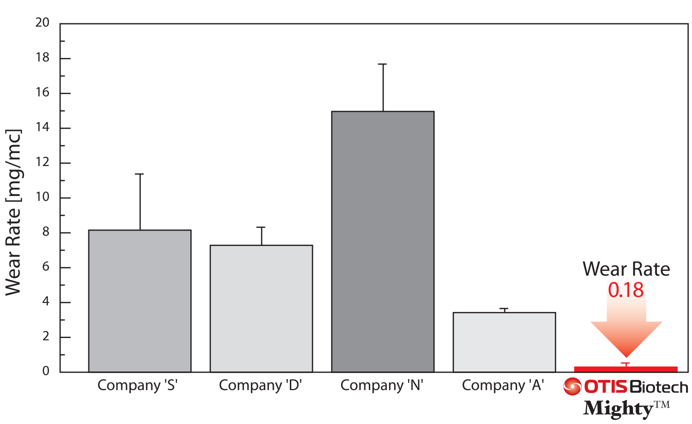
Seal lock™ - Acetabular System

Acetabular component is composed od Ti-6A1-4V ELI biomaterial and its anatomical structure conforms the most common and popular design and shape, which is hemispherical acetabular component.
The design focused on to minimize the stress concentration, which in turn will minimize the debris production.

Mighty™ highly cross linked polyethylene liners showed the lower wear rate of 0.18mg per million cycles than the commercially available highly cross linked polyethylene liners in the market.

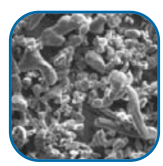


Mighty™ highly cross linked polyethylene surface after 5 million Cycles.



Oxidation Index

Mighty™ highly cross linked polyethylene samples tested, before and after accelerated aging. All samples were tested in accordance with Orthoplastics and ASTM 2102-01e1 (The Standard Guide for Evaluating the Extent of Oxidation in Ultra-High-Molecular-Weight polyethylene Fabricated Forms Intended for Surgical Implants) Aging was conducted in accordance with ASTM F2003-02 (The Standard Practise For accelerated aging of Ultra high Molecular weight Polyethylene after gamma Irradiated).



Plasma sprayed surfaces are clinically well proven and have been in use for a number of years. Plasma sprayed surfaces allow for the thickness and roughness of the coating to be tuned in order to optimise the performance of the fixation surface, which in this case has 322㎛ of Titanium, 85㎛ of pore size and a roughness of Rz >200㎛

Ceramic on ceramic bearing couple - the most logical approach in wear resistant tribology.

Assembled with 28 mm head, acetabular component enables mean 140 degrees of ROM. At the lower portion of acetabular component, a barrier for rotation and direction control exists.

In the Flat liner, direction control sulcus exists to control 40 degress of motion.
10 Degree Elevated liner allowed approximately 30 degrees of rotation.

Seal lock™ - Bipolar System

Biomechanical Principle of Positive eccentricity

As downward force is applied, the 2 different points of rotation between the shell and femoral head center align themselves to the proper anatomical position and proper load distribution. These stable action can be achieved through the principle of positive eccentricity.

This dual articulation was primary inner articulation to reduce secondary outer acetabular articulation and acetabular wear

The bipolar cup system was designed to require very little pressure to snap the polyethylene insert over the femoral head and next, to slide the metal cup over the insert. In revision cases, the bipolar cup system can be easy disassembled and removed with intact femoral head.

Because the insert designed to be unitary structure, generation of debris from the impingement between parts can be minimize compared with other liners in the market.

Introduction

The fixation mode of acetabular component is primarily mechanical and dependent on a physical interlock between the cup and reamed acetabulum and secondary fixation is biological and is with osseous integration at the implant-bone interface by means of bone growth onto or into the substrate.
For achieving long term clinical success it is essential that this stable fixation between the implant and the bone must be maintained, even after complete resorption of the hydroxyapatite.
This can only be achieved with stable press fit design of acetabular cup. The Seal lock™ cup is capable of achieving excellent stability with the press fit design and porous coating using press fit technique.
The design philosophy of Seal lock™ provides a fully congruent shell to polyethylene liner interface contact from exciting tolerances, secure locking mechanism, optimal thickness of polyethylene liner, which reduces the wear rate and stress that lead to failure.