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Tornier Pyrocarbon Humeral Head

Advanced bearing hemi arthroplasty

This isn't a traditional orthopedic bearing surface.

It's innovation to a T.

Total shoulder arthroplasty (TSA) is a widely accepted procedure to reduce pain and restore function.[1,2] TSAs are not without complications. A primary mode of TSA failure is glenoid component loosening.[3] Shoulder hemi arthroplasty is an alternative to total shoulder arthroplasty if there is a concern about glenoid component loosening. Compared to TSAs, hemi arthroplasty's limitations are higher revision rates, lower patient-reported outcomes, and wear to cartilage and bone.[4]

Pyrocarbon is an advanced bearing material for shoulder hemi arthroplasty. Pyrocarbon is supported with data to show biocompatibility,[5] and potential for less damage to cartilage and bone than cobalt chrome hemi arthroplasty.[6,7]

Unlike TSA implants, the Tornier Pyrocarbon Humeral Head System does not require glenoid alteration or instrumentation, thereby providing more options in case of future revision. Pyrocarbon has been shown to have good clinical function and minimal radiographic glenoid erosion at the mid-term mark.[7,8,9]

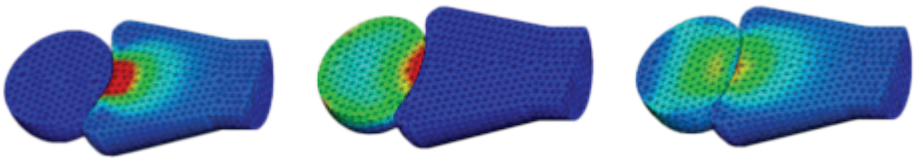
Excelling in elasticity

Modulus of elasticity quantifies how a material or substance changes as stress is applied. Traditional metallic orthopedic bearing surfaces have higher modulus of elasticity than cortical bone. It has been documented that shoulder hemiarthroplasty glenoid erosion can occur when using metallic heads and may be partially due to the inelasticity of the material.[10,11]

The pyrocarbon material has a modulus of elasticity more similar to bone than cobalt chrome.

	Silicon	Polyethylene	Graphite	Bone*	Pyrocarbon	Titanium (Ti4Al6V)	Cobalt Chromium	Alumina (Al_2O_3) (Ceramic)
Elasticity (GPa)	0.004	0.2–0.7	11	**11–17**	**25–30**	110	200–240	400

*Depending on direction (longitudinal or transverse).



Ceramic **Polyethylene** **Pyrocarbon**

Bio-tribology

The body's method of natural joint lubrication is multifactorial. It has been shown that one factor of joint boundary lubrication is the connection of proteins from synovial fluid to the outer layers of the articular joint surfaces in the body.[12] This process is called phospholipid adsorption. It has been shown that phospholipids from synovial fluid have a higher attachment rate on the pyrocarbon material than metallic surfaces.[13,14] This, combined with a modulus of elasticity closer to bone, is theorized to be why pyrocarbon generates less wear (benchtop/mechanical testing)[6] and has a lower revision rate than cobalt chrome hemi arthroplasty (clinical data).[15]

Implant offerings

The Tornier Pyrocarbon Humeral Head is cleared for use with the Tornier Flex Shoulder System for shoulder hemi arthroplasty. It is available in 20 options of diameter, height, and offset. The Pyrocarbon Humeral Head is assembled during manufacturing to a double Morse taper (cobalt chrome plate/taper) which allows connection to the Tornier Flex Shoulder System.

Low offset taper

High offset taper

Diameter	Height	Offset
39mm	14mm	Low and high
41mm	15mm	Low and high
43mm	16mm	Low and high
46mm	17mm	Low and high
48mm	18mm	Low and high
50mm	16mm	Low and high
50mm	19mm	Low and high
52mm	19mm	Low and high
52mm	23mm	Low and high
54mm	23mm	Low and high

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Manufacturer:

Tornier SAS
161 Rue Lavoisier
38330 Montbonnot Saint Martin
France
t: +33 (0)4 76 61 35 00

stryker.com