



# BIOLOX<sup>®</sup> Ceramic Knee

The Metal-Free Knee Arthroplasty

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The MULTIGEN PLUS Ceramic Knee (Limacorporate)



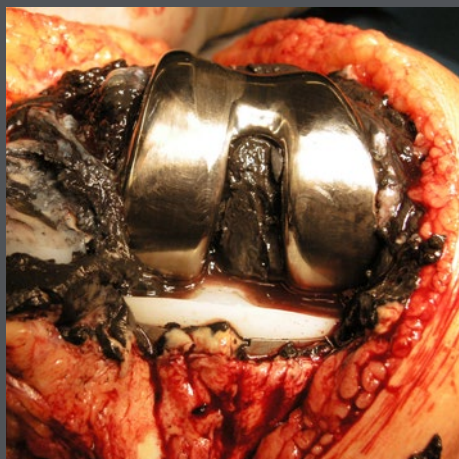
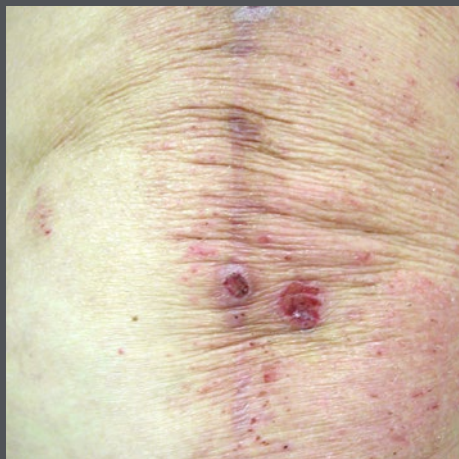
The BPK-S Ceramic Knee (Peter Brehm GmbH)

- Excellent biological behavior<sup>41</sup>
- No known risk of allergy<sup>7,8,43,44</sup>
- No metal ion release<sup>40</sup>
- No known pathogenic reaction to ceramic particles<sup>41</sup>
- Reduced risk of infection<sup>31-37</sup>
- Lower wear of polyethylene against ceramic<sup>22,24,39</sup>
- High hardness and scratch resistance<sup>42</sup>
- Resistance to third-body wear<sup>21,23</sup>
- 5 successful years in clinical use<sup>1-13</sup>



**BIOLOX® inside**  
Beyond comparison since 1974

# BIOLOX® Solution for Metal Sensitive Patients



**Top:** Skin reaction (eczema), persisting pain, joint effusion, swelling, hyperthermia and limitation of function with metal hypersensitivity (Co, Cr, Ni) after TKA with conventional CoCr femoral component.

**Bottom:** Operative findings: Metallosis and synovitis after TKA

Source: CeramTec/Usbeck

*“The prevalence of metal sensitivity among patients with a well-functioning implant is approximately 25%, roughly twice that of the general population.”*

Hallab et al.<sup>16,25</sup>

In vivo, metals release ions that cause biological reactions. The alloy used for articulating components typically contains metals such as cobalt, chromium and nickel. Several case reports and clinical studies report the clinical manifestations of metal allergy as eczema, disturbed wound healing, recurrent effusions, local swelling, persistent pain, osteolysis and reactions similar to pseudotumor with subsequent muscle destruction.<sup>14,15,17,19,26–30</sup> In many cases sensitivity to these allergens has resulted in revision of the knee implants.

*“Ceramic implants are a promising solution for patients with allergies against metallic implant materials.”*

Bergschmidt et al.<sup>7</sup>

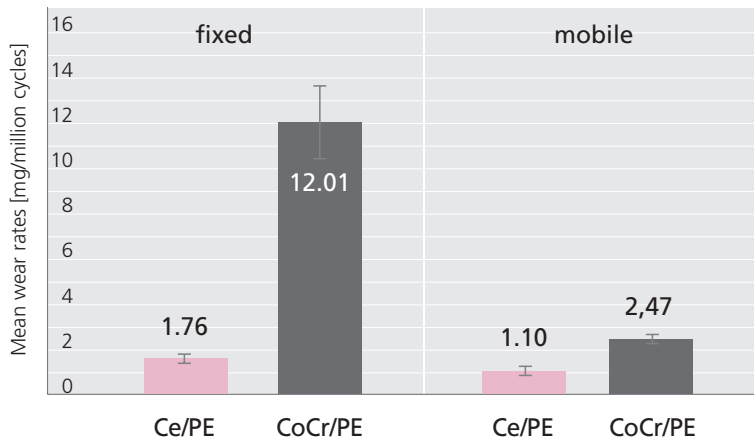
High-performance ceramics are biocompatible and bioinert.<sup>45</sup> The ceramic material does not elicit any known allergic reactions. Case reports of hip and knee replacements have described significant improvement of symptoms and reduced levels of metal ions when revision is performed using ceramic components to address adverse reactions to components of metal implants.<sup>7,45–50</sup> BIOLOX® ceramics are extremely stable and well tolerated by tissues.<sup>39,51</sup> For this reason, ceramic components are now used also in knee arthroplasty.<sup>52,53</sup> The extremely hard and smooth surface minimizes polyethylene wear.<sup>21,39</sup>

# BIOLOX<sup>®</sup> Superior Tribological Behavior

## Superior Tribological Behavior of Ceramics

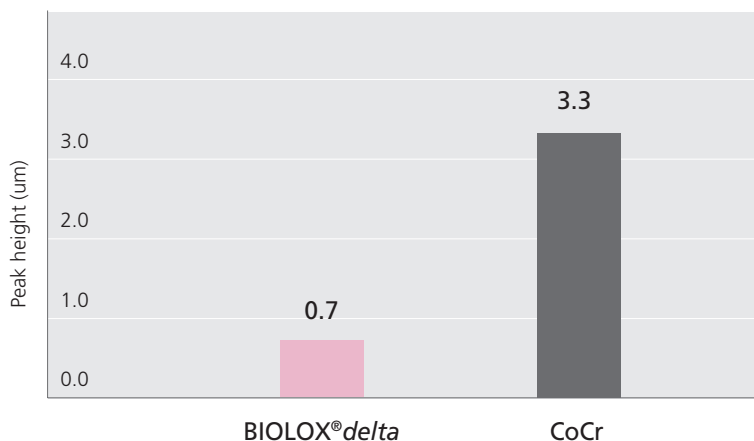
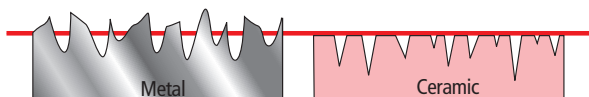
- Polyethylene wear up to 7x lower than with CoCr<sup>54,55</sup>

### Gravimetric wear / 1 million cycles



*The wear behavior of ceramic femoral components against PE in fixed and mobile TKA tested in accordance to ISO 14243-1 showing the average gravimetric wear per 1 million cycles in comparison to CoCr components against PE.*

- A knee with ceramic femoral component generates less heat than a knee with the same design using a cobalt-chromium alloy<sup>18</sup>
- High scratch resistance with very low surface roughness<sup>42</sup>



*Surface peaks of BIOLOX<sup>®</sup>delta and CoCr respectively after the third body wear test.*

- No scratches on polyethylene<sup>20,38</sup>

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