

## Re: artificial knee

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*Source:* <http://sci.tech--archive.net/Archive/sci.materials/2005-11/msg00034.html>

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- *From:* Seth Imhoff <[sdimhoff@xxxxxxxx](mailto:sdimhoff@xxxxxxxx)>
  - *Date:* Thu, 17 Nov 2005 21:23:17 -0600
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ameyapurohit@xxxxxxxx wrote:

> As a part of my course work in material sciences, I am writing a paper  
> on the kind of materials used in an artificial knee. Its more of  
> engineering stuff than medical. The info that I require is on the  
> properties of the material & why those materials only. The more  
> exhaustive the info the better. Kindly help me out on this one. Thank  
> You. Ameya  
>

The exact materials involved in each step are subject to change simply because bio and biocompatible materials are really hot areas of research right now, but this example should help in terms of what to look for.

In the replacement, the end of the femur, patella and end of the tibia are replaced due to cartilage damages, but I'll just give you an example of the tibia part. It is a combination of polymer and metallic components. The end of the tibia is replaced with a sort of baseplate of porous tantalum (we are talking on the order of 80% porosity). In the US, it must be cemented into the tibia. The surface of the baseplate has to act like a cartilage surface so UHMW polyethylene is compression molded into and above the porous metal. So what you end up with is a sort of composite baseplate of porous metal and polymer. The remaining porosity that hasn't been filled in with polymer acts like a matrix to promote bone growth.

Specific materials aside, the goal is to not only reproduce the functionality of each component part, but also allow for bone and tissue regrowth (biocompatibility and growth design). When you find different examples of materials you should also keep in mind what they look at in terms of strength and fatigue. These parts really can't break or you are putting the patient in severe danger.

Seth  
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- *References:*
  - ◆ [\*artificial knee\*](#)

Re: artificial knee

◇ *From:* ameyapurohit

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