The future of permanent, fully integrated prosthetic limbs and b...
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Pistorius, demonstrates that the material construction of the implant itself is not the limiting factor in design or performance. Properly securing a Flex-foot that is required to absorb and deliver Olympic forces requires several hours of assembly and fitting. It no doubt is also unbearable to wear it longer term, even when not under load. Now infamous for other reasons, Oscar (pictured right) did not have the ideal implant on hand when the time came to stand up to an intruder.

The prosthetic leg recently implanted in medical trials by the Royal National researchers was developed by Stanmore Implants. It calls its device the ITAP (Intraosseous Transcutaneous Amputation Prosthesis). The inspiration for it came from a curious paper published some time ago in Journal of Anatomy titled “Nature’s answer to breaching the skin barrier.” It describes the innovations used by mammals to create a strong and antiseptic bone-to-skin interface — in other words, antlers. The researchers dissected the subcutaneous antler bone of red deer — 20 of them actually — and they found that they have highly porous geometry. This enables the surrounding soft tissue layers to grow directly into the bone where it can be stabilized.

Even the strongest soft-to-hard interface will eventually be compromised if it is not impervious to bacteria and viruses. As we know, skin breaches, even in the dry places like under your nails, are uniquely susceptible to infection. Interfaces that are moist, such as the gums or eyes, require extra accommodations and immune surveillance to keep them secure. By mimicking the antler construction, researchers were able to design implants that can form a tight seal with the surface and deeper level tissue and therefore keep infection out.

Read: Brown University creates first wireless, implanted brain-computer interface

Titanium implants that bond to bone typically have special coatings to increase surface area and adherence. One such surface treatment used is hydroxyapatite (HA), the main component of bone mineral itself. HA was shown to attract fibroblasts, the types of cells that manufacture the collagen which increases strength and elasticity in subdermal tissue. In the ITAP implant, a 40mm titanium alloy (Ti6Al4V) pin is coated with HA on the bone-anchored region below the skin. Above the skin, the surface treatment transitions into a DLC coating (diamond-like coating) on the smooth external part that is polished to prevent bacterial colonization. For the exit wound point, a technique known as marsupialization (presumably after the skin pouch of marsupials) was used. Here a circular cut is made in the skin and the epidermal layer is bonded along the edges. Provided that the underlying fibroblast layer is intact, the epidermal cells of the skin surface will be prevented from migrating down around the implant shaft and compromising the integrity of the seal.
Stanmore Implants' main line of business is making products for internal fixation of bone that has been compromised by injury or cancer. Its experience in designed devices that incorporate HA to control bone growth makes it well-poised for the trans-skeletal (transhuman?) device market. In addition to the new ITAP implants, it has also developed an intriguing space-age method for elongating bone. The movie below shows how its “extendible” prostheses implanted into long bones works. It uses an integral 12000:1 reduction drive that is electromagnetically lengthened by the remote force of an external rotating magnetic field, without the need for additional surgery or anesthetic.
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"DLC coating "
you want the rest of your feet? buy that DLC with toes!

but seriously that video looks like a BMW commercial ^^

"Now infamous for other reasons, Oscar did not have the ideal implant on hand when the time came to stand up to an intruder."................wow..........just wow....Let's not trivialize these scientific breakthroughs with unrelated stories. Yes there's a tenuous link there but it's really not needed.

Noted and appreciated, though counter that trivial is reading a whole story about cutting age tech and only having motivation to comment on its most tenuous part

Fair call, Don't get me wrong the technology is fantastic and is a positive move forward in prosthetics, but trivialising it by using the tech story to have a pop at Pistorius isn't needed. Maybe i should have led with praising the tech 1st, but i found the Pistorius crime reference unnecessary (the only link him having prosthetics? If we're going on that logic why isn't Abu Hamza mentioned? ) in a story that should have focused entirely on the work of the relevant engineers in the design of these improvements.

The funny thing is today I scarcely remember anything from the couple of stories I wrote yesterday. Yet as I read "Pistorius crime