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Orthopedic Implants that are Safely Absorbed after the Body has Healed

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Technology description

Promotes new bone and prevents stress shielding to speed recovery

These nontoxic biomedical implants stabilize fractures or temporarily assist the healing of damaged bone. The body safely absorbs these devices once they are no longer needed. Composed of a magnesium alloy that contains calcium and strontium, these implants not only mimic natural bone's mechanical properties, but also promote osteoblast cell function to speed recovery times. When certain orthopedic problems do not respond to conservative treatment, surgical implants can reduce pain and increase mobility. In developed countries, an aging population and increasing obesity rates fuel the need for more of these types of surgical interventions. Forecasts project the global orthopedic implants market to reach $6.2 billion by 2024. Researchers at the University of Florida have developed nontoxic implants that dissolve completely once the body has repaired itself. The implants also promote faster healing times and decreased risk to healthy bone tissue from "stress shielding," where overly rigid implants absorb the stress that bones need to retain their strength.

Technology

University of Florida researchers have invented a nontoxic magnesium alloy for biomedical applications that contains smaller amounts of calcium and strontium. While pure magnesium’s softness causes premature degradation, adding too much calcium or strontium leads to an overly rigid implant. Careful design has resulted in a final product that accurately mimics real bone tissue’s mechanical properties.

Application area

Nontoxic magnesium alloy implants that stabilize fractures and promote new bone growth before dissolving

Advantages

Stays in the body only as long as it is needed, minimizing allergy and sensitization issues
Does not require removal surgery, enhancing patient comfort and lowering costs

Uses calcium and strontium to promote bone formation, speeding recovery
Mimics natural bone, resulting in greater implant stability and decreased risk to healthy bone tissue from "stress shielding"

Institution

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