CUSTOMISED IMPLANTS FOR LOAD BEARING JOINTS

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This invention offers minimally invasive implants for the repair of load bearing joints. The procedure for the formation of these joints provides customisable implants thus reducing the need for unnecessary and painful healthy bone removal, reducing costs and recovery time.

Brief Description

Surgical knee replacement implants generally use designs that require surgical procedures where large volumes of bone matter are cut away to allow the standardised implants to fit. These operations result in excessive trauma and pain during post-operative and recovery phases.

In this innovation, the procedure used for the production of the load bearing implants allows for customisable implants based on individual needs, removing the need for excess removal of healthy bone. The result is minimally invasive surgical implants with reduced operating time and cost as well as the accompanying reduced post-operative pain and discomfort.

Target Market

This invention is of particular interest to patients in need of implants of load bearing joints, particularly hips and knees, as well as hands, feet, spine, ankle, shoulder, elbow and wrist joints. It will be of special interest to patients contracting condylar arthritis.
Value proposition/ Benefits

- This innovation offers reduced manufacturing time of the implant, resulting in reduced costs compared to the currently used manufacturing processes such as subtractive and additive rapid prototype methods.
- The unique procedure for forming the implant allows for customisable implants, based on individual needs.
- The surface of the product requires no finishing such as polishing or coating.
- It provides for less invasive surgical procedures
  - Reduces unnecessary removal of unaffected bone matter
  - less trauma and pain during post-operative recovery

Unique Characteristics

- The implants of this innovation are customisable to individual needs
- The product offers less pain to the patient in comparison to conventional knee replacement implants
- Less invasive surgical procedures means faster recovery

Technical Description

The currently employed production processes for biomedical implants are machined from solid blocks of material at substantial cost and wastage of material. This can be very expensive especially in the case of materials such as titanium, which are chosen because of their corrosion resistance properties and biocompatibility with the human body. The innovative production of this invention proves to be more cost effective than that currently used. In addition to this, the final product does not require additional finishing.

As the biomedical implants currently produced generally consist of standardised implants they are fitted to the bone by modifying the outer structure of the bone. This procedure requires the unnecessary removal of healthy bone matter and is known to cause trauma and pain during the recovery phase of the operation.

The implants of this innovation will support minimal invasive surgical techniques to reduce patient pain and discomfort and minimise operating time and related trauma.

Innovation Status

It is currently in developmental phase and it is the subject of a provisional patent application.

Principle Researchers

Dr Andre F. van der Merwe holds the chair for industrial engineering at the Engineering Faculty at the University of Stellenbosch, Dr Tiaan Oosthuizen is a post-doctoral researcher, and Pieter De Waal Eksteen is an MSc Engineering Student.

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