Siemens PLM Software

Automating the image to implant process

Orthopedic innovations over time

- **1970s**: Metal joint replacements
- **1980s**: Computer-assisted surgery
- **1990s**: Arthroscopy
- **2000s**: Tissue engineering
- **2010s**: Robotics, 3D printing, personalized implants

**Knee implants**
- 1% million knee replacements annually by 2015
- The American Academy of Orthopaedic Surgeons predicts the number will rise 24% in the next five years

**Hip implants**
- Over 175,000 hip replacements by 2015
- The AAOS predicts the number will rise 174% in the next twenty years

**Spinal implants**
- Over 715,000 spinal procedures by 2015
- The AAOS predicts the number will rise 165% in the next twenty years

**Why personalization?**

**Industry trends:**
- Aging demographics, obesity, active lifestyles
- Efficacy of patient outcomes
- More educated consumers
- Differentiation: 6 of the top 10 orthopedic companies are working on personalized products

**Aging demographics**
- By 2030, over 78 million U.S. adults were obese – National Center for Health Statistics (NCHS) Data Brief, January, 2010
- By 2050, the 65-plus population will double to about 71.5 million, and by 2050 it will grow to 86.7 million people – United States Census
- People desire less recovery time so they can more quickly resume their active lifestyles.

**Challenges facing orthopedic mass customization**

- **Speed bumps:**
  - Manual processes
  - Inter-depot exchange
  - Manufacturing and logistics

- **Accuracy:**
  - Multiple data formats
  - Manufacturing precision
  - Variations

**Varieties of personalization**

- Surgical robots and computer-assisted surgical tools:
  - Cutting guides
  - Navigation
  - Haptic feedback
  - Implant placement

- Custom implants:
  - Knee
  - Hip
  - Spinal
  - Ankle
  - Shoulder
  - Maxillofacial

- **Knee implants:**
  - Half-million knee replacements annually
  - The American Academy of Orthopaedic Surgeons predicts the number will rise 673% in the next twenty years

- **Hip implants:**
  - 175,000 hip replacements annually
  - The AAOS predicts the number will rise 174% in the next twenty years

- **Spinal implants:**
  - 715,000 spinal procedures annually
  - The AAOS predicts the number will rise 165% in the next twenty years

**Siemens answer to challenges**

**Benefits of using Siemens PLM Software automation**

- Faster:
  - Image to CAD in hours
  - Manufacture with time onlinist
  - 3D printing capability

- More efficient:
  - Optimized surgical programming
  - Minimized toolpath programming
  - Reduced new implant collaboration across the patient value chain
  - Gives off-the-shelf inventory

- Reduced costs and better response time = higher margins

For more information and a demonstration, go to: siemens.com/plm/i2i