Medical Device Development
Driving Innovation from Research to Industry

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Overview

Driving Innovation from Research to Industry

✓ CBCT Scanning Technology

✓ 3D Printing Technology
Customized Implant Design and Manufacturing

CBCT
Medical Imaging
CAD Design
3D Printer
Clinical
Customized Implant Design and Manufacturing

- CBCT
- Medical Imaging
- CAD Design
- 3D Printer
- Clinical
3D Printing

MEDICAL APPLICATIONS

Neuro (50%)

CranioMaxillofacial (30%)

Orthopaedic (15%)

Dentistry (4%)

Vascular (1%)
Medical Models

- Pre-operative Planning
- Surgical Simulation
- Medical Training
CUSTOMIZED IMPLANT

- Perfect Restoration
- Pre-fabricated Implant
- Reduce Operative Time
- Reduce Risks

Surgical Aid/Devices

- Linking from Planning to Surgery
- Improve precision and accuracy
Clinical Experiences > 1,800 Cases (100 Hospitals)

Number of Patients


0 50 100 150 200 250

4 8 6 10 22 33 56 59 115 165 186 209 174 144 136 165 206 32

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Customized Implant Design and Manufacturing

CBCT → Medical Imaging → CAD Design → 3D Printer → Clinical

CBCT
Medical Imaging
CAD Design
3D Printer
Clinical
3D Printing Technologies (R&D)

Selective Laser Lithography (SLL)
- SLL Machine
- The samples

Selective Laser Melting (SLM)
- SLM Machine
- CoCr part

Selective Laser Ceramics Lithography (SLCL)
- SLCL Machine
- HA part

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Medical Devices
3D Printing Technologies (R&D)

Digital Light Processing (DLP)

- DLP Machine
  - Scaffold after sintering at 1,300 °C

Multi-Extrusion Printer

- Multi-Extrusion Printer
  - The samples

3D Bioprinter

- 3D Bioprinter
  - Cellular patterns
Customized Implant Design and Manufacturing

- CBCT
- Medical Imaging
- CAD Design
- 3D Printer
- Clinical
DentiiScan (เดนติ์สแกน) - Dental Cone Beam CT

Prof. Dr. Pairash Thajchayapong, Program Director
Dr. Kriskrai Sitthiseripratip, Head of Hardware Team
Dr. Saowapak Thongvigitmanee, Head of Software Team
Thai Dental CBCT Scanner

Research & Development
- Hardware Development (DentiiSCAN)
- Software Development (DentiiVIEW, DentiiPLAN)

Clinical Trials under National EC Approval (10/2011-06/2012) > 500 cases
- Faculty of Dentistry, Chiang Mai University: Installed 06/2011
- SDC (Suthasinee Dental Clinic): Installed 07/2011

Compliance Testing
- Radiation Safety Passed (Inspected by Department of Medical Science, MOPH)
- Electronic Safety Passed IEC 60601-1 (Inspected by PTEC, MOST)

Production Facility
- NECTEC Pilot Plant: TÜV SÜD ISO 13485 (Issued since: April 2015)

Installed in 3 Hospitals/ Dental Clinics (>4,000 Cases)
- Faculty of Dentistry, Chiang Mai University (Since 2011)
- SDC (Suthasinee Dental Clinic: Since 2011)
- Thammasat University Hospital (Since 2013)

Installing 6 Hospitals Supported by TCELS 4 M/C
- Chiang Rai
- Phrae
- Sakon Nakhon
- Surat Thani

Supported by NRCT (วช) 2 M/C
- Institute of Dentistry
- Lerdsin

Licensing: Under Negotiation
Application: Dental Implant Planning
MobiiScan (โมบีสแกน)
Mobile CBCT

Research & Development
• Hardware Development (MobiiSCAN)
• Software Development (MobiiVIEW)

Clinical Trials
• Faculty of Dentistry, Chiang Mai University
• Faculty of Medicine, Chulalongkorn University
• Faculty of Medicine, Prince of Songkha University

Compliance Testing
• Radiation Safety Passed (Inspected by Department of Medical Science, MOPH)
• Electronic Safety Passed IEC 60601-1 (Inspected by PTEC, MOST)

Production Facility
• NECTEC Pilot Plant: TÜV SÜD ISO 13485 (Audited)
Total System for Medical Devices Development

Committee
- NHSO/SSO/CGD
- Bureau of the Budget
- Funding Agency
- KOL Surgeon
- R&D Institute/University
- Regulator
- Industry

R&D
- NSTDA (NECTEC/MTEC/BOTEC/NANO)
- Universities
- TCELS

Testing Agency
- PTEC
- TISTR
- สถาบันไฟฟ้า
- สถาบันเหล็ก
- University Labs

Clinical Trials Center
- University Hospitals
- Public Hospitals

Regulator
- Thai FDA
- TISI (สมอ)

Industry
- BOI
- MOI (DIP/BSID)
- FTI (MEDIC)
- INNOTHAI
- Thai Med

Clinical
- Surgeons (Neuro/Plastic Ortho/Dental/Surgery/...)
- Hospitals (University/Public/Private)
Pilot Collaborative Project: Thai-Japanese Total Knee Arthroplasty

Title
“Cooperative Research and Development Project on Knee Joint Prostheses and Three-dimensional Surgery Support System” Supported by NEDO

Collaborative Project: MTEC – TEIJIN NAKASHIMA MEDICAL CO., LTD.
Digital Disruption: Digital Dentistry

Patients → Dental Clinic

Fabrication → Cloud → Digital Image

Design Center

Mobile Internet
Automation of knowledge work
Internet of Things
Cloud technology
Advanced robotics
Autonomous and near-autonomous vehicles
Next-generation genomics
Energy storage
3D printing
Advanced materials
Advanced oil and gas exploration and recover
Renewable energy

McKinsey
Medical Devices
Thank You

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