3D LIFEPRINTS

PROVIDER OF IN-HOUSE MEDICAL 3D PRINTING HUBS
WHO ARE 3D LIFEPRINTS?

OUR MAIN HUBS

- **Alder Hey Children’s Hospital**
  - Multi-disciplinary

- **De Granier Hospital**
  - Cutting guide speciality

- **Wrightington Hospital / Johnson & Johnson**
  - Orthopaedic Speciality

- **Nuffield Orthopaedic Centre / University of Oxford**
  - Research & Training Speciality

- One of the UK’s leading medical 3D technology providers
- Experienced team of medical clinicians, scientists, bio-medical engineers and industry experts
- Work with over 30 NHS Trusts, private institutions, medical device manufacturers, leading universities and research facilities
- Have a number of existing medical 3D printing hubs and contracts with the NHS
- Provide a variety of proven personalised medical solutions using 3D technologies to enhance patient care & lower operational costs
WHAT IS A MEDICAL 3D PRINTING HUB?

• 3D LIFEPRINTS WILL EMBED EXPERTS AND 3D TECHNOLOGY INTO YOUR INSTITUTION TO PROVIDE A MULTI-DISCIPLINARY SERVICE

• WORKING CLOSELY WITH YOUR SURGEONS, OUR TEAM WILL TAKE PATIENT MEDICAL SCAN DATA AND USE IN-HOUSE 3D PRINTING TECHNOLOGIES TO MANUFACTURE MEDICAL SOLUTIONS FOR PRE/INTRA SURGICAL PLANNING AND ANALYSIS, SIMULATION AND TRAINING

• A WIDE VARIETY OF PERSONALISED MEDICAL PRODUCTS CAN BE MANUFACTURED IN-HOUSE TO COVER ALL CLINICAL AND SURGICAL DISCIPLINES WITHIN YOUR ORGANISATION - CARDIOTHORACIC, GENERAL, NEUROSURGERY, ORAL & MAXILLOFACIAL, ENT, PLASTIC SURGERY, TRAUMA & ORTHOPAEDIC, UROLOGY AND VASCULAR
WHAT CAN IT OFFER?

ANATOMICAL MODELS FOR PLANNING

PROSTHETICS & ORTHOTICS

BESPOKE MEDICAL SIMULATION SOLUTIONS

MEDICAL INSTRUMENTS

SURGICAL GUIDES

IMPLANTS
HOW ARE 3D PRINTED MEDICAL DEVICES CREATED?

SEGMENTATION
From an image scan, we reconstruct the patient’s anatomy in 3D

3D PLANNING
A biomedical engineer will discuss with you the proposed treatment and validate the virtual planning

DESIGN
The engineer will then design the patient-specific devices to accurately translate the digital plan

MANUFACTURE
Once the design is approved, we will manufacture the devices using cutting-edge 3D printing technology

SURGERY
The devices are then supplied to your hospital
WHAT ARE THE BENEFITS TO YOUR ORGANISATION?

**IMPROVED PATIENT CARE**

- Greater understanding of patient anatomy
- Enhanced communications with patient
- More effective planning
- Less time spent under anaesthesia
- Over using CT/MRI 2D images
- Easier to explain to patient their condition and the procedure & pre-op counselling
- More planning with 3D model results in more rehearsal, repetition, leading to better outcomes
- Less risk & potential for complications

**LOWER OPERATIONAL COSTS**

- Reduction in time spent in theatre through more effective pre-surgical planning with a 3D model
- Our studies show 0.8 hours reduction per surgery*
- Ability to perform more operations
- The use of 150 models over a year can allow 60 more operations with the time savings in theatre*
- Can avoid need for further surgical procedures
- Through better planning
- Helps surgeons choose appropriately sized medical devices e.g. septal occluders
- Cost savings & improved patient care

*Over avg 2 hour surgery
WHAT HAS BEEN PUBLISHED ABOUT THE BENEFITS OF MEDICAL 3D PRINTING?

- Measuring and Establishing the Accuracy and Reproducibility of 3D Printed Medical Models
  - Radiological Society of North America

- The Trends, Sector Use Cases and Steps to Accelerate Your 3D Printing Journey
  - Earnst & Young

- Clinical Efficacy and Effectiveness of 3D Printing: A Systematic Review
  - British Medical Journal

- From Ideas to Long-Term Studies: 3D Printing Clinical Trials Review
  - US National Library of Medicine

- Medical 3D Printing at Point of Care
  - Springer.com
Why wouldn’t I do it myself? What are the approx costs and challenges?

### High Setup and Running Costs

<table>
<thead>
<tr>
<th>Description</th>
<th>Cost</th>
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<tbody>
<tr>
<td>Full Time Bio-Medical Engineer Per Annum</td>
<td>$45,000</td>
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<tr>
<td>Small 3D Printer Fleet - 2 X 3D Printers (Initial CAPEX)</td>
<td>$60,000</td>
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<tr>
<td>3D Materials, Maintenance, Consumables Cost Per Annum</td>
<td>$25,000</td>
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<tr>
<td>Medical &amp; 3D CAD Modelling Software (1 Licence for One Year Per Application)</td>
<td>$25,000</td>
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<tr>
<td>High-End Laptop for 3D / Segmentation Work</td>
<td>$2,500</td>
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<tr>
<td><strong>Total</strong></td>
<td><strong>$157,000</strong></td>
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### Resourcing, Training, Network, Legal Challenges

- Lengthy Setup Timescales
- 3-6 Months to Train Staff
- A Need to Comply with Regulatory Frameworks & Directives
- A Need to Setup Relationships with Vendors

- First Year CAPEX & OPEX Cost
- Based on creation of 150 3D Printed Medical Devices
- Year 2 OPEX Costs ~ $100,000
- Hardware needs refreshing ~3 to 5 years
What are the details of using 3D Lifeprint’s Service? What do I get?

- Integration with your PACS system for easier data transfer
- Rapid setup & turnaround of models
- No other charges - all material costs, maintenance and consumables included in service
- Advanced medical/3D CAD modelling software
- 150 x 3D printed medical devices
  - 100 x standard
  - 30 x operable
  - 20 x digital simulations
EXAMPLES OF WORK
PATIENT SPECIFIC ANATOMICAL MODELS FOR PRE-SURGICAL PLANNING

SIZING SEPTAL OCCLUDER HEART MEDICAL DEVICES

PLANNING CORRECTION OF MIS-ALIGNED PELVIS
PATIENT SPECIFIC ANATOMICAL MODELS FOR PRE-SURGICAL PLANNING

HEART SEGMENT WITH RED CALCIFICATION

RESPIRATORY MODEL
PATIENT SPECIFIC ANATOMICAL MODELS FOR PRE-SURGICAL PLANNING

SPINE MODEL FOR FRACTURE/SCOLIOSIS REVISION

ACCESSORY LIMB WITH VASCULATURE
3D PRINTED ANATOMICAL MODELS TRAINING / RESEARCH

3D URETERS ANATOMICAL MODEL

LIVER CANCER ANALYSIS
PATIENT SPECIFIC ANATOMIC MODELS FOR SIMULATION

CONGENITAL HEART DEFECT REPAIR

BRAIN FLUID DRAIN

PARTIAL KIDNEY NEPHROECTOMY
3D PRINTED CUSTOMISED TRAINING SOLUTIONS

REALISTIC SKIN SUTURE TRAINER

SINUS SURGICAL TRAINER

GALL BLADDER TRAINER (CALOT’S TRIANGLE)
3D PRINTED PATIENT SPECIFIC SURGICAL CUTTING GUIDES (STERILISED)

GLENOID SHOULDER CUTTING GUIDE

FREE FLAP FIBULA CUTTING GUIDE
3D LIFEPRINTS – INDUSTRY RECOGNITION

3DLP’S BUSINESS MODEL OF SETTING UP COMMERCIAL 3D PRINTING HUBS IN MEDICAL INSTITUTIONS IS HIGHLIGHTED (FROM PAGE 142) IN A REPORT COMMISSIONED BY NHS ENGLAND ON "THE PERSONALISED MEDICINE TECHNOLOGY LANDSCAPE".

3DLP COMMENDED AS ONE OF THE TOP HEALTHTECH COMPANIES IN THE UK IN PUBLIO.IO “THE PROMISE OF HEALTHTECH” - HOW DIGITAL INNOVATORS ARE TRANSFORMING THE NHS (PAGE 43)

NEWABLE, THE MARKETING ARM OF THE DEPARTMENT OF TRADE AND INDUSTRY CREATED A SERIES OF VIDEOS SHOWCASING 3DLP

DELOITTE – 3DLP DESCRIBED IN THE FUTURE OF HEALTHCARE - POTENTIAL AND IMPACTS OF 3D PRINTING IN THE HEALTHCARE SECTOR “AS LEADING THE WAY IN THE UK FOR SUPPLY CHAIN EVOLUTION FOR 3D PRINTING AT THE POINT OF CARE IN MEDICAL INSTITUTIONS”

ONE OF ONLY 3 UK MEDTECH COMPANIES TO BE CHOSEN TO SPEAK AT THE BRITISH MEDICAL ASSOCIATION’S AGM

2 https://www2.deloitte.com/content/dam/Deloitte/be/Documents/life-sciences-health-care/The%20future%20of%20Health%20Care_ENG.pdf
4 https://vimeo.com/241165141
5 https://www.youtube.com/watch?v=gQQ_3Uqcr6g#action=share
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