3D printing - from idea to clinical practice

Vera Lagerburg
5 February 2020
OLVG

- Top clinical teaching hospital
- Two main locations in Amsterdam
- 500,000 patients annually
- Largest emergency care department in the Netherlands
The beginning (1)
The beginning (2)

Enthusiastic people
The beginning (3)

Small projects, mostly ergonomic tools
Feasibility study
Feasibility study - conclusion

- Lots of potential applications
  - Surgical guides
  - Anatomical models
  - Patient specific devices, such as braces, wafers
  - Phantoms for skillslab
- Lots of enthusiastic physicians
Skillslab

- Safe application, no patients involved
- Phantoms
- Injection arm
Surgical guides (1)

- Orthopedic surgeon from Vumc to OLVG
- Legislation
- Start OLVG with help of A-UMC, location VUmc
Surgical guides (2)

- Patients with SCFE (slipped capital femoral epiphysis)
- Also patients with malunions after fractures or growth disturbance because of abnormalities in the growth plate.
Surgical guides (3)

- Current treatment in OLVG: intertrochanteric osteotomy approach
- 3D virtual planning of intertrochanteric-osteotomy
- 3D printing of patient-specific surgical guide
- In difficult cases printing of patient-specific plate because normal plate doesn’t fit
Surgical guides (4)
Surgical guides (4)

- Design of surgical guides

Case selection → Medical imaging (CT) → Segmentation (D2P) → Preoperative planning → Design (Solidworks)

Evaluation → OR → Sterilization → Check & post-processing (OLVG) → Printing

Deviation analysis → Check by physician

Check by physician

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Plates (1)

- Design of plates
Plates (2)

- Strength analysis in cooperation with NLR
Evaluation – position plate
What do you need?

- Software
  - Segmentation software
  - Designing software
  - Software for strength analysis
- Hardware
  - 3D printer
- Expertise
  - Internal
  - External
- Enthusiasm
- Money
- Quality system
Quality system

- May 2020 -> medical device regulation
- In house development -> quality system
- 3D printing -> custom made or not?
Insourcing or outsourcing
Evaluation/research

• Evaluation study surgical guides
• Evaluation study injection arm
• Evaluation study plates in cooperation with A-UMC, location AMC
Future applications (< 1 year)

- Surgical guides for back- and shoulder orthopaedics
- Guides for oral- and maxillofacial surgery
- Anatomical models cardiology
- Diverse devices for plaster room
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Thanks for your attention