

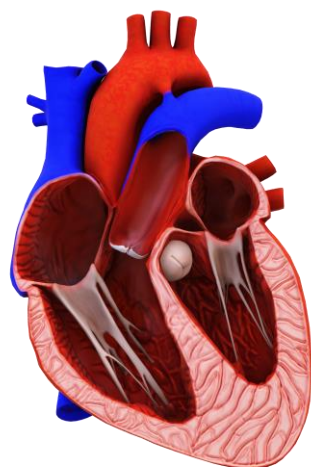


Prifysgol Cymru
Y Drindod Dewi Sant
University of Wales
Trinity Saint David



DIGITAL SKILLS AND RESEARCH METHODS (BMSW4003_LON)

HEALTH AND SOCIAL CARE GROUP 3



3D PRINTING TECHNOLOGY IN HEALTH INDUSTRY

Student Name	Student ID	Topic
Ivelina Succaria	2010919	Introduction and Background
Gabriel Kolonji	2013871	Challenges
Sabrina Moncayo	2007929	Insights
Maryna Krainiuk	2011437	Impact
Ana-Maria Neagu	2009930	Lessons and conclusion

Koushik Modak
University of Wales Trinity Saint David
Presentation Date 10/12/2020

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Royal National Orthopaedic Hospital

Cholmeley (1985)

1905- 1907

Royal Orthopaedic
Hospital
National Orthopaedic
Hospital and
City Orthopaedic
Hospital

1909

King Edward VIII opens
the new facilities on
Great Portland Street

1922

The hospital is moved
to Stanmore.



1979

Rehabilitation
Assessment Unit

1984

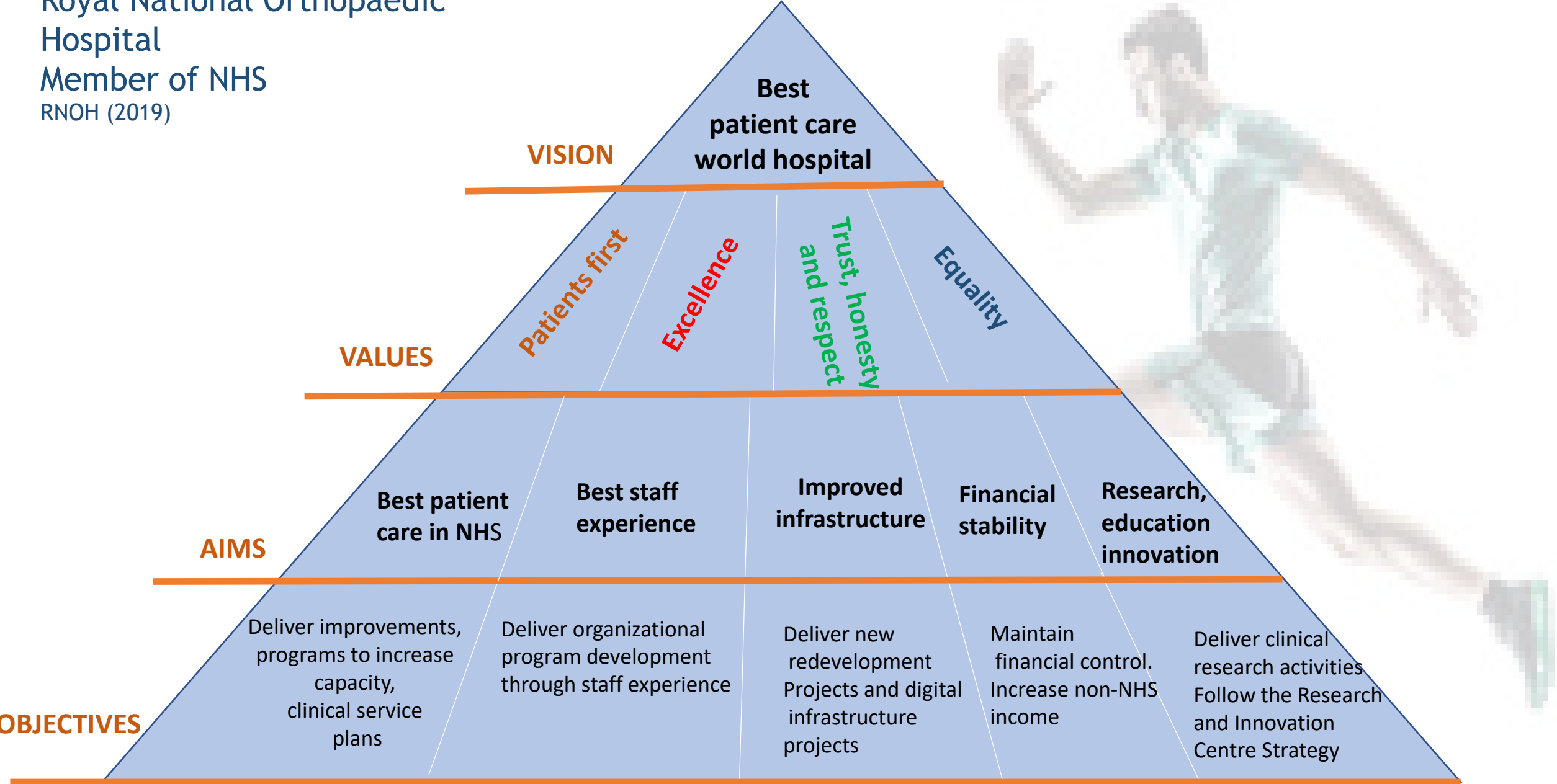
Spinal Injuries Unit
opened.

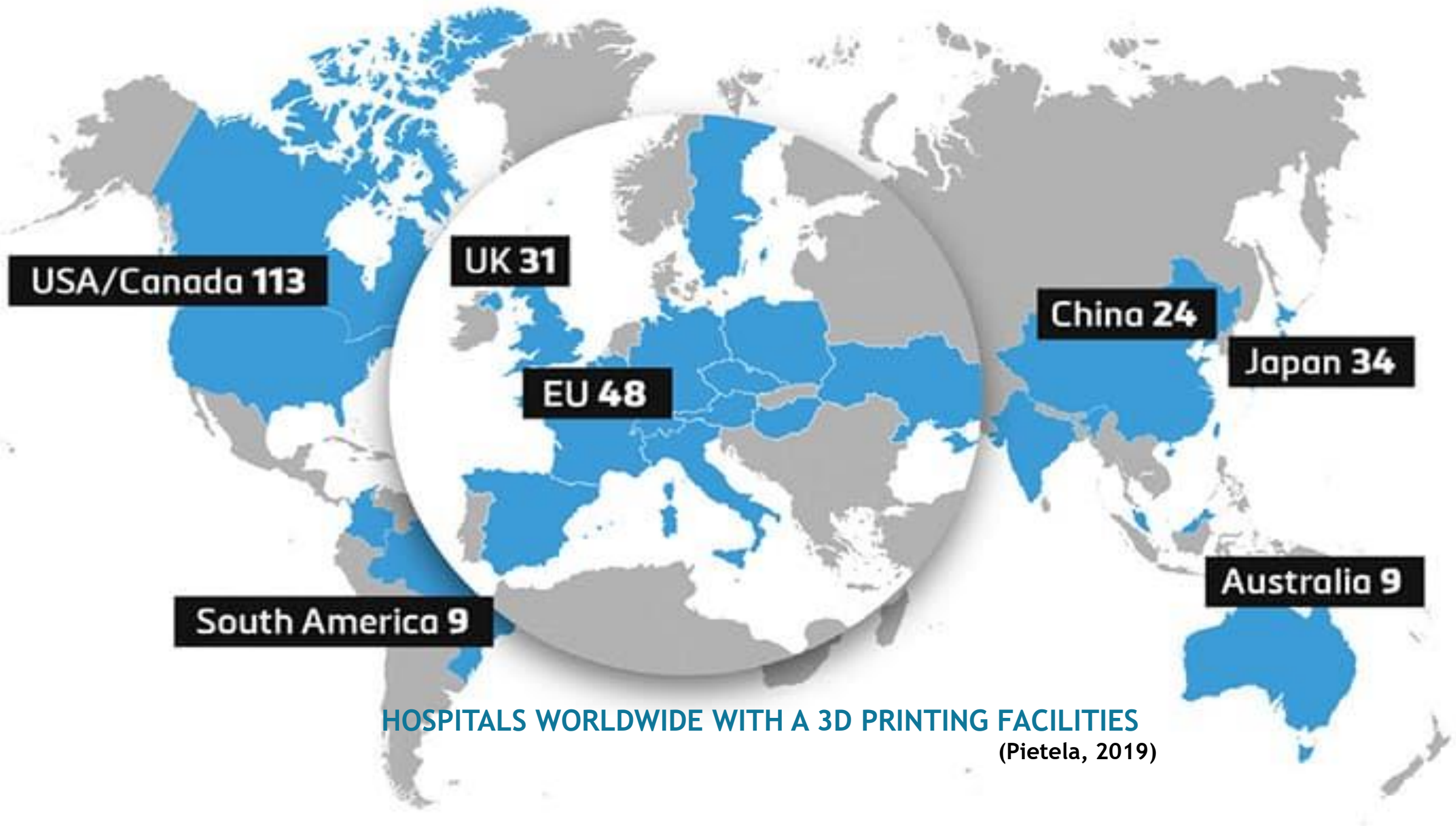


2006- 2019

Rapid development.







CHALLENGES BEFORE INTRODUCTION OF 3D PRINTING TECHNOLOGY

(Team, 2018)

- ▶ Hospitals were not able to perform some of the operations that 3D printing technology makes possible now.
- ▶ Patient Specific Orthopaedics
- ▶ Operations were a complicated, difficult and long process which involved a lot of staff for more than 5 to 6-hour-operations.
- ▶ Patients suffered of long post operation recovery and sometimes had to pass another operation.
- ▶ The operation and post-operation periods were long, hospitals faced problems with long list of waiting for intervention patients.

INSIGHTS OF THE MODERN TECHNOLOGY



Image source:
<https://www.dezeen.com/2015/10/08/movie-sebastiaan-deviaene-design-medical-implants-3d-printed-video-game-software/>

3D PRINTING

- ▶ Additive manufacturing has evolved extensively over the years (...)
- ▶ These techniques form (...)
- ▶ One of the techniques mentioned uses (...)
- ▶ Being able to print layer by layer allows complex parts to be printed as said earlier. (...)

(Alreja, 2020)

In addition to the complex geometry, printers can utilize all different kinds of materials, such as:

- 
- 1) Plastic
 - 2) Powders
 - 3) Resins
 - 4) Metal
 - 5) Carbon fiber
 - 6) Graphite and graphene
 - 7) Nitinol
 - 8) Paper
 - 9) Ceramic

(Surface Treatment Experts, s.f.)

THE 3D PRINTING PROCESS: HOW DOES IT WORK?



- ❖ Step 1: CAD Model
- ❖ Step 2: Slicing
- ❖ Step 3: Setting up the Machine
- ❖ Step 4: 3D Printing

(MANUFACTUR3D, 2018)

3D PRINTING IN HEALTH AND SOCIAL CARE

- ▶ According to the NEOSCOPE, surgeons in Australia have successfully performed a world-first transplant surgery (...)
- ▶ The 3D printed tibia was wrapped in blood vessels and leg tissue from both of his legs.
- ▶ This surgery paves the way for the successful transplantation of major bones

(Lant, 2017)



Image source:

<https://www.australianmanufacturing.com.au/46997/qld-surgeons-successfully-transplant-3d-printed-shinbone-to-save-patients-leg>

POSITIVE IMPACT OF 3D PRINTING



Medical Education and Training



Treatment of Patients



Time



Cost saving



Environment

NEGATIVE IMPACT OF 3D PRINTING



Safety



Loss of jobs



Copyright

LESSONS DRAWN FROM THE CASE STUDY



If today's health enterprises or any organisation are not able to implement modern technology and use it to maximum they will not be able to progress.



Involving modern technology in the health sector will offer an easy access to medical services which will improve people's life quality and lead to a longer lifetime.



Nowadays we realize that behind the technology is human brain. Without trained staff we cannot put in function any kind of technology.

CONCLUSION

- ▶ 3D printing offers great potential in the effective treatment of patients.
- ▶ Demonstrates a potential reduction of time in treating patients.
- ▶ 3D printing brings a lot of benefits to society .
- ▶ This technology is constantly improving the medical system.
- ▶ 3D will soon become a norm in many medical facilities.

REFERENCES

- 3D Printing in healthcare 2020-use 3D printing in the Fight Against COVID-19, Normans Media Ltd, M2 Presswire, 2020-06-12. (UWTSD library)
- Implementation of 3D printing in ophthalmology, Summer, Adir C; Blumenthal, Eytan Z; Berlin/Heidelberg Springer Berlin Heidelberg, Graefe's archive for clinical and experimental ophthalmology, 2019-09-05, Vol 257(9), p 1815-1822. (my UWTSD library)
- Pietila, T. (2019). <https://www.materialise.com/en/blog/3d-printing-hospitals>. [image].
- Cholmeley, J. (1985) *History of the Royal National Orthopaedic Hospital* (1st ed.). Chapman and Hall Ltd.
- Royal National Orthopaedic Hospital. (2019). *Annual Report*. https://improvement.nhs.uk/documents/5746/Royal_National_Orthopaedic_Hospital_NHS_Trust_Annual_Report_and_Accounts_2018-19.PDF
- Team, M. (2018). *3D Printing For Orthopaedic Surgery - Medimodel*. [online] Medimodel. Available at: <https://medimodel.com/article/3d-printing-orthopaedic-surgery/#:~:text=Orthopaedics%20has%20been%20among%20the%20first%20medical%20fields,and%20surgical%20training%2C%20patient-specific%20instruments%2C%20and%203D-printed%20> [Accessed 10 December 2020].

REFERENCES

➤ MANUFACTUR3D, 2018. MANUFACTUR3D. [Online]

Available at: [https://manufactur3dmag.com/3d-printing-](https://manufactur3dmag.com/3d-printing-process/#:~:text=%20The%203D%20Printing%20Process%3A%20How%20does%20it,is%20loaded%20into%20the%20printer%20and...%20More%20)

[process/#:~:text=%20The%203D%20Printing%20Process%3A%20How%20does%20it,is%20loaded%20into%20the%20printer%20and...%20More%20](https://manufactur3dmag.com/3d-printing-process/#:~:text=%20The%203D%20Printing%20Process%3A%20How%20does%20it,is%20loaded%20into%20the%20printer%20and...%20More%20)

[Last Access: 1 12 2020].

➤ Alreja, R., 2020. How 3D Printing is Changing the Medical Device Field. Quality, 59(3), pp. 18-20.

➤ Lant, K., 2017. NEOSCOPE. [Online]

Available at: <https://futurism.com/neoscope/man-receives-worlds-first-3d-printed-tibia-replacement>

[Last Access: 15 11 2020].

➤ Surface Treatment Experts, s.f. Surface Treatment Experts. [Online]

Available at:

<https://www.sharrettsplating.com/blog/materials-used-3d-printing/#:~:text=%20What%20Materials%20Are%20Used%20for%203D%20Printing%3F,is%20used%20through%20a%20process%20known...%20More%20>

[Last Access: 15 11 2020].