



Chip implantation in the human hand: an introduction to biohacking

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1

Case

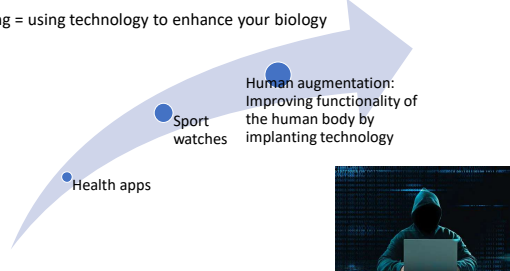
- 23 year-old male
- Bike accident, fell on gravel road
- Foreign body, metal splinter,....?
- = biochip (NFC/RFID)



2

What is biohacking?


Biohacking = using technology to enhance your biology



3

Radio-frequency identification device (RFID)

- = microchip attached to an antenna that passively reacts to a signal sent from its reader by using a shared magnetic field.
- Near Field Communication (NFC)
- No GPS tracking !



4

Examples of RFID/NFC functions

- Contactless payment
- Access control
- Veterinary medicine: identification
- Healthcare: tracking equipment, instruments and drugs
- Human augmentation:
 - Magnetic
 - Contactless payment
 - Access control
 - Medical information
- Programming: before and after implantation by user self

5

Thousands Of Swedes Are Inserting Microchips Under Their Skin

Would you be willing to have your COVID health pass implanted in your hand?

HUMANS AND TECHNOLOGY

This company embeds microchips in its employees, and they love it

Last August, 50 employees at Three Square Market got RFID chips in their hands. Now 80 have them.

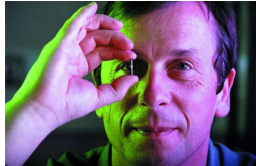
Some employees are even using their hand implants for work monitoring, payments

The chips can be used to login to PCs, use company machines, and make purchases -- but how many will sign up?

6

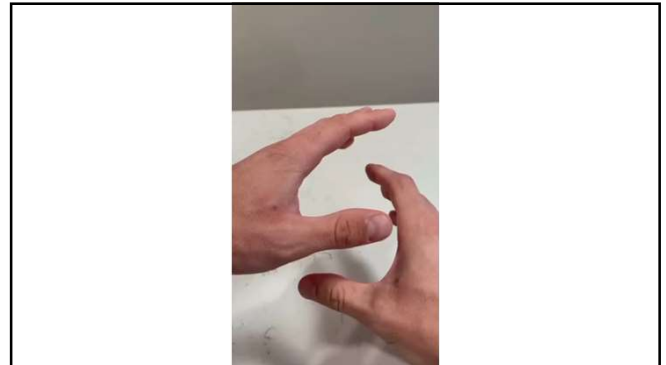
New hype?

- Prof. Warwick (Reading University 1998)
- Survey 2002 (UK): 51% consider for contactless payment
- Est. 50-100.000 people have already been chipped



Report - European Payments Landscape 2030
 CNN - Is human chip implant wave of the future?

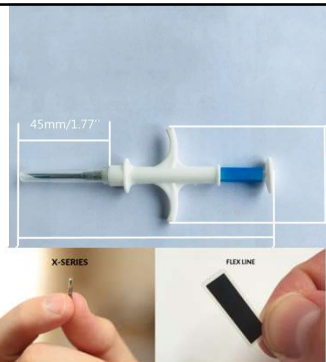
7



8

How to get it?!

- Different companies sell different sterile chips, variety in size and shape.
- ex. 'Dangerous Things, Seattle, USA'
- No government regulation.
- FDA approval 2004

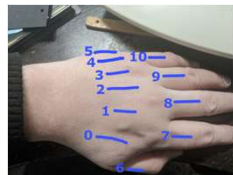


FDA approves implantable chip to access medical records
www.fda.gov/oc/2004/04/040404a.htm

9

Implantation guidelines?

- Implantation by user self or tattoo artist.
- Most frequently in first dorsal web space.
- Not advised within <5mm of each other or bone.
- >5 cm apart if on same frequency.



A practical guide to microchip implants | Ars Technica

10

Risks and complications.

- FDA guidance 2004 on RFID
 - Adverse tissue reactions, migration, failure, MRI incompatibility

Fed Regist. 2004 Dec; 10(69237):71702-4.

Medical devices; general hospital and personal use devices; classification of implantable radiofrequency transponder system for patient identification and health information. Final rule

Food and Drug Administration, HHS.
 PMID: 15587485

11

Adverse tissue reactions

- Foreign body related infection
 - Sterile procedures?
 - S. aureus → biofilm
 - Implant removal and antibiotic therapy.
- Foreign body granuloma
- Tendinopathy
 - Superficial extensor tendons
- Sterile osteitis
- Postinjection fibrosarcoma?

Biobackers and Self-Made Problems: Infection of an Implanted RFID/NFC Chip: A Case Report

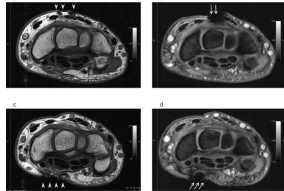
Tumors in long-term rat studies associated with microchip animal identification devices

Foreign-body osteitis of the metacarpal bone

12

MRI compatibility

- MRI can cause minimal translation and torque → artifacts
- NO chip dysfunction
- In hand, difficulty in diagnosing pathologies



Safety and reliability of radio frequency identification devices in magnetic resonance imaging and computed tomography

Journal of Clinical Medicine 2019, 8(10):1553

13

Conclusion

- RFID will become more frequent
- Offered by companies (and hospitals?)
- Recognise RFID implants
- Possible complications
- Future role of hand surgeons?



14

Questions?



"I don't know why I was suspended from doing surgery! I'm not the one who loaded the Appendix app rather than the GallBladder app!"

15