

HARDWARE REMOVAL

tips and tricks
from a residents perspective

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"REMOVAL OF HARDWARE
=
A RESIDENTS JOB"

-Every orthopaedic surgeon ever-

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IMPLANT REMOVAL

Having an op soon? DON'T watch this video: Horrific clip shows doctor violently beating metal rod out of patient's bone with a HAMMER

- Patient's shocking operation to remove a metal rod from their spine
- Was originally inserted to hold the broken bone in place, while it healed
- When a surgeon hammering, dislodged it from its socket in a way that
- Exposed. The surgeons are beating "with a bit more gusto than usual"

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IMPLANT REMOVAL

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IMPLANT REMOVAL

Implant removal represents for many patients the true completion of fracture treatment.

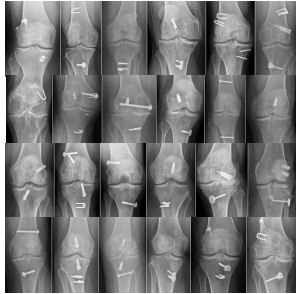
While respecting the patient's wishes the expense, utility, and risks of implant removal must be considered and communicated.

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IMPLANT REMOVAL

Before implant removal further x-rays must be taken to

- confirm fracture healing
- evaluate the type, condition, and location of implants
- ensure correct implant removal equipment is available.



INDICATIONS FOR IMPLANT REMOVAL

Number of reasons for removal

Early removal for position screws

Late removal more common in young patients and in lower limbs
Especially in patella and malleoli

Upper limb, generally not necessary nor recommended
main reason is soft-tissue irritation or pain

External fixators and K-wires are always completely removed
danger of secondary displacement or migration
pin-track infection



INDICATIONS FOR IMPLANT REMOVAL

In some patients psychological alterations, simply by its presence...



INDICATIONS FOR IMPLANT REMOVAL

Metallic implants are **not chemically inert**

May undergo chemical changes,
Metal ions in body
=> Toxic reactions

Metal uptake is increased in stainless steel as compared to titanium

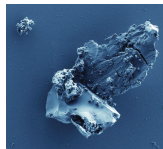
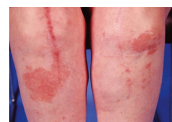


image courtesy of Catherine Van Der Straeten, MD, PhD



INDICATIONS FOR IMPLANT REMOVAL



Allergictype hypersensitivity

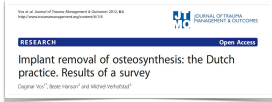
Rare with stainless-steel
Practically unknown with pure titanium
Decision is based on intensity of reaction





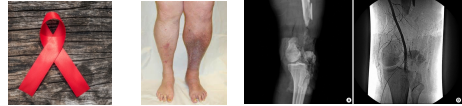
INDICATIONS FOR IMPLANT REMOVAL

Indications for implant removal **lack proper guidelines**
surgeon's attitudes = strongly based on beliefs and not on evidence
 The decision still **depends on individual factors**
Wide variations between countries



RISKS AND BENEFITS

Risks and benefits must be estimated
 Immune deficiencies (HIV, Hepatitis, TBC,...)
 Local circulatory disturbances (DM, peripheral arterial disease,...)
 Implants in areas with a high elevated risk of iatrogenic nerve or vessel damage

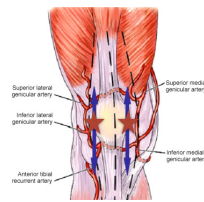


PLANNING SKIN INCISION

Previous scars must be carefully considered
most lateral incision
 Blood supply from lateral branches of genicular arteries
not possible?
 => new incision is required at least 6cm away
 Avoid incision convergence
 Do not dissect subcutaneously



PLANNING ARTHROTOMY



arthrotomy should be performed on same side as previous arthrotomy!
 => increased the risk of patellar necrosis and fracture



TIMING REMOVAL AND IMPLANTATION TKA

There is **no consensus** on the timing of the removal

1-stage procedure

2-stage procedure

- + More predictable operative time
- + Possible to take microbiology samples
- Increased anaesthesia time
- Patient discomfort
- Higher costs



TIMING REMOVAL AND IMPLANTATION TKA

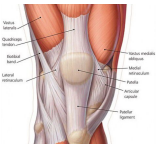
In case of bulky hardware (tibial plateau fracture, HTO,...)

Necessity of detachment of anatomical structures

- anterior tibialis muscle
- Superficial MCL
- pes anserinus tendons

=> induce slower rehabilitation

literature recommends 2-stage procedure





ALTERNATIVES WHEN HARDWARE IS IN SITU



SOME TIPS FROM A RESIDENTS PERSPECTIVE

PREPARE YOURSELF!

- Check the x-ray
 - Hardware type and brand
 - Number of screws
 - Position of hardware

Positioning of the patient

Make sure you have a screw extraction set nearby

Also a milling cutter can help...



And as last resort...



IMPLANT REMOVAL



...your boss needs to give the final hit



THANK YOU!



Acknowledgements: Prof. Dr. Jan Victor and Dr. Nele Arnout for providing some of the images

