

Metal Allergy in Joint Replacemnt: Fact or Fiction?

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- Author fees:
 - JBJS
- Consultant:
 - Depuy (Johnson & Johnson)
 - Stryker
 - Orthodevelopment

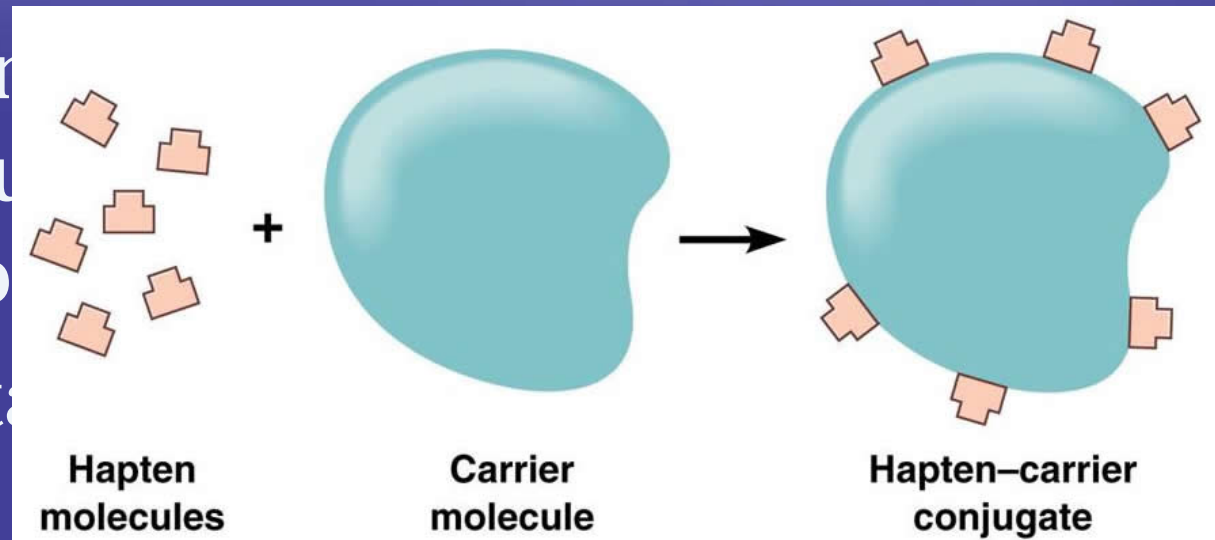
- Fact: Metal sensitivity is very common
 - 10-15% of general population¹
- Typically reported as sensitivity to inexpensive jewelry
- By far the most common allergy is to nickel, followed by cobalt.



- Nickel and cobalt are common in modern orthopaedic implants
 - Cobalt chrome (TKA) contains ~1% nickel
 - ~65% cobalt
- It follows then that metal allergy after TKA should be very common.
- EXCEPT . . .

- IT'S NOT!
- Incidence is unknown but estimated to be $\ll 1\%$
- Even when 22% of female and 2% of male TKA patients report metal sensitivity²
- Why???

- Metal ions (not present in high concentration)
- “naked” metal ions elicit a weak immune response
- When patients react to a molecule (ion), they are actually reacting to a hapten-carrier complex



- Dermal metal ions are processed and presented by Langerhans cells, generating a Type IV allergic response
- These complexes are different on the skin than in the serum
- Dermal reaction and systemic reaction to a metal antigen are likely different

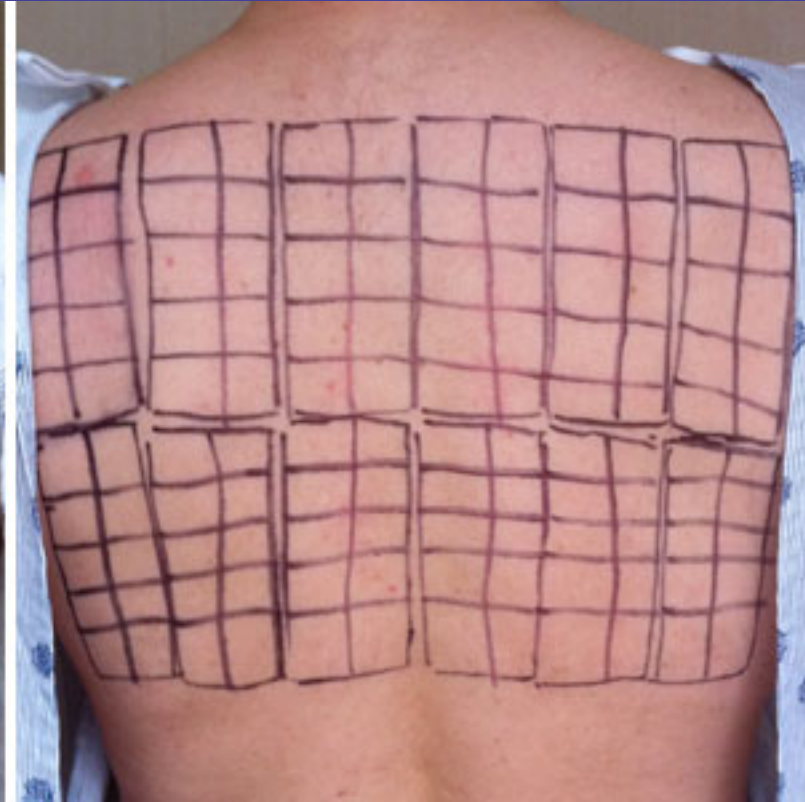
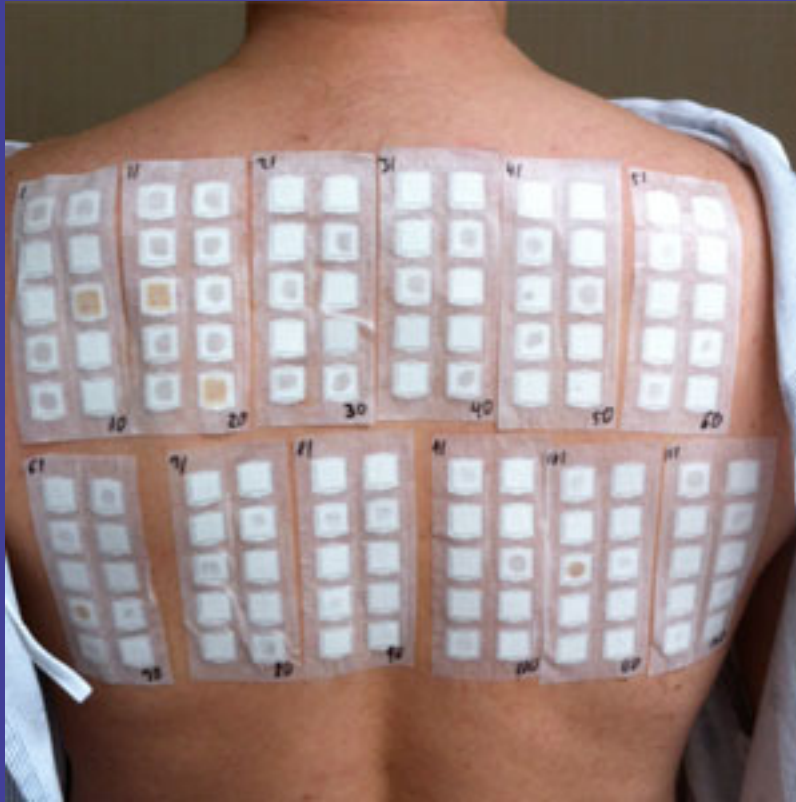
- Is metal allergy to joint implants real?
- Yes
- But, it is very, very rare
- Most surgeons will go their entire careers without seeing a true case of metal allergy to a joint implant

- Fiction:
- Metal allergy to an implant primarily presents as pain
- Most case reports describe a rash and stiffness as the primary complaint⁵
- Most reactions are localized, but some are systemic





■ Patch testing



- Widely available and inexpensive
- Almost any antigen can be tested
- Many consider it to be the gold standard for determining sensitivity to metal prior to surgery
- 85% of patients who report a history of metal sensitivity will have + patch test³

- Patch testing accuracy is questionable
- Cutaneous reaction is NOT the same as serum reaction
- Nearly all patients with positive patch tests have no signs of allergic response to metal implants³
- **Pre-operative patch testing has no correlation or predictive ability for implant reaction³**

- Lymphocyte Transformation Test (LTT)
- Thought to be more accurate than patch testing
- Unlike patch testing, is quantifiable
- Is the gold standard for metal sensitivity AFTER joint replacment

LTT: However

FROM :OrthopedicAnalysis,Hallab

FAX NO. :708-445-7335

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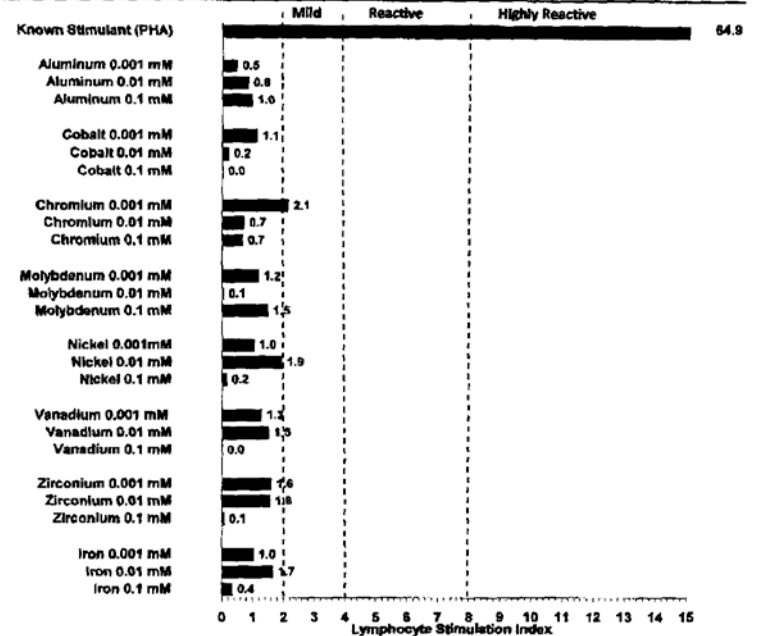


Metal-LTT Analysis Report

Panel 1

Report Date	01/24/12	Sample Collected	01/16/12	NL
Report Time	12:08 PM	Sample Received	01/17/12	10:30 AM
Patient ID	3516	DOB	02/16/56	
Report For	Mitchell, Peggy			
Attending Physician	Dr. Ong, Alvin			

Control cpm	1572.0
Positive control (PHA) cpm	102003.7



Mildly Reactive	2 to 4
Reactive	4 to 8
Highly Reactive	above 8

- LTT is not widely available
- Not covered by most insurances (\$500)



- Most of the literature describing metal allergy to joint implants are case reports (and of questionable quality)
- There is increasing public interest in this topic





What do you need to do?



- Pre-op:
- Patch testing is of little to no value
(patient history is almost as accurate)
- LTT is unrealistic and of little value

- What I do?
 - If patient reports a strong allergy (I don't ask) I do u implant





What do you need to do?



- Post-op:
- I would advise against writing a case report if you do find a patient
- When working up a painful total joint, metal sensitivity should be the LAST item on your list
- I do all testing (including LTT) before revising
- Typically is a diagnosis of exclusion
- Be wary of the patient with positive testing, but pain is only symptom



Thank you

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