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Latex to Latex Free Initiative – which benefits?

Stephan Rohleder, Pediatric Surgeon

KINDERchirurgie
Kinder werden bei uns groß geschrieben.
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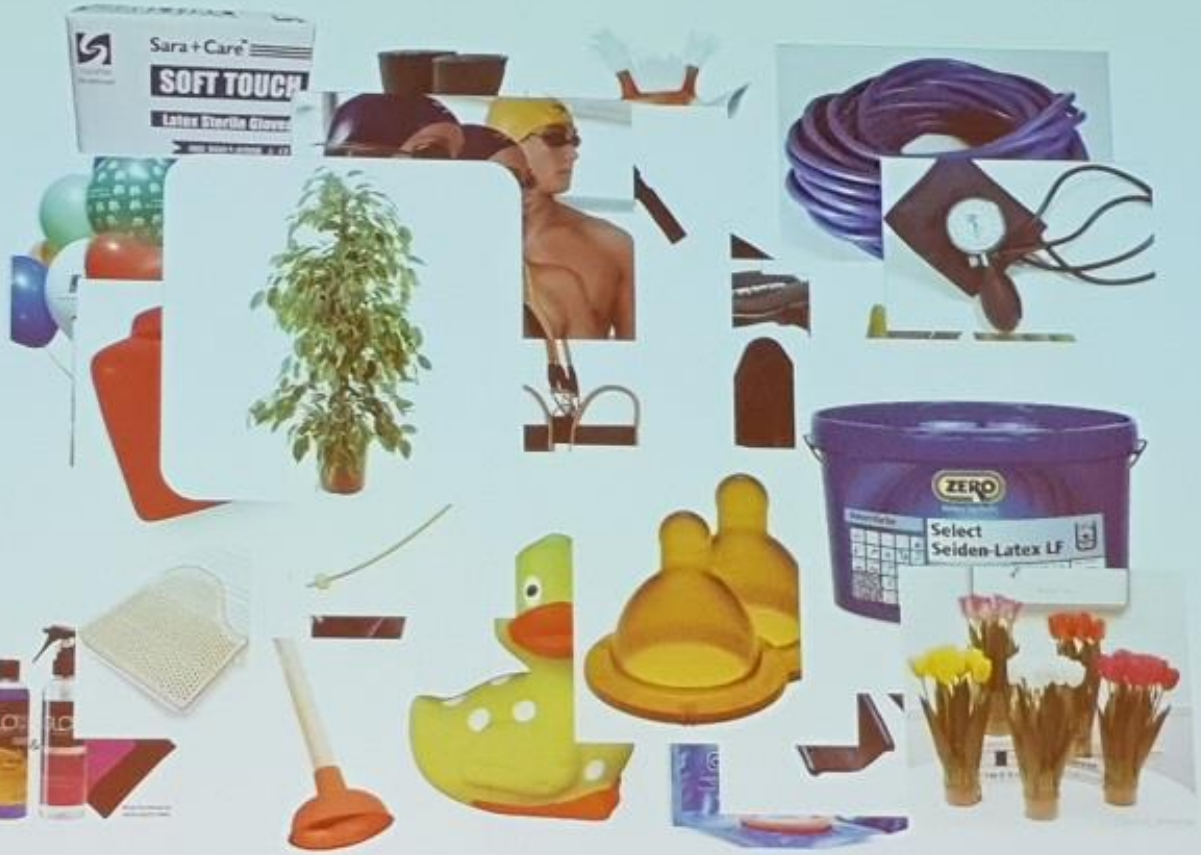
Introduction

What is Latex and where do we use Latex?

- **Natural rubber Latex** is a milky fluid harvested from the rubber tree *(Hevea brasiliensis)*
- Orig. *caoutchouc* from the words “caa” (tear) and “ochu” (tree)

- **Synthetic Latex** can be made by polymerizing e. g. styrene/styrol

Introduction



Definition

Latex Allergy: ***Type I Reaction***

- Severe *immediate* IgE-mediated hypersensitivity reaction which may lead to *significant morbidity* or *mortality*.
- Sensitization *after first exposure* induces production of IgE-antibodies specific to Hev b.
- *Cross-reactions* with *food intolerances* (avocado, banana, kiwi, chestnut etc.)

1. According to the American Latex Allergy Association (ALAA).

[1]

Symptoms

Latex Allergy: ***Type I Reaction*** – Symptoms [1]

- **Skin:** itching, redness, urticaria
- **Oral:** itching and swelling of lips and/or tongue
- **Throat:** scratchy throat, tightness, hoarseness
- **Lung:** cough, wheezing, difficulty breathing, bronchospasm
- **Gastrointestinal:** vomiting, diarrhea, cramps
- **Cardiac:** weak pulse, hypotension, dizziness, fainting

1 Simmons B. LATEX ALLERGY and ANAPHYLAXIS fact sheet. 2014. http://latexallergyresources.org/anaphylaxis-fact-sheet.

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Definition

Latex Allergy: *Type IV Reaction*

- Delayed onset immunologic T-cell-mediated reaction to additives (accelerators) of latex
- Most common (chronic) reaction to latex exposure (12-72h)
- Never life-threatening, but bothersome

Symptoms

Latex Allergy: ***Type IV Reaction*** – Symptoms [1]

- Erythema with papules, vesicles, oozing skin areas.
- If repeatedly contact with the allergen, may become a chronic problem

1. Simmons E. Latex allergy. ANAPHYLAXIS fact sheet. 2014 http://latexallergyresources.org/anaphylaxis-fact-sheet.

Riskfactors

Who is at risk for Latex allergy?

- **Newborns** and **small infants** with **multiple surgeries** [1] or repetitive **exposure** [2] to latex:
  - *13-fold increased risk* for Latex hypersensitivity after previous surgery [3]
  - Repetitive urethral , rectal or intrathecal catheterization
- Spina bifida patients [4]:
  - ⇨ 65% Latex hypersensitivity
    - ⇨ 49% *allergic reactions* after exposure to Latex
- Children/Patients with atopic neurodermitis

1. Paul, A., et al., *[Latex-free hospitals: benefits and disadvantages].* Arch Pediatr, 2015. **22**(11): p. 1162-7.
2. Chen, Z., R. Cremer, and X. Baur, *Latex allergy correlates with operation.* Allergy, 1997. **52**(8): p. 873.
3. Hourihane, J.O., et al., *Impact of repeated surgical procedures on the incidence and prevalence of latex allergy: a prospective study of 1263 children.* J Pediatr, 2002. **140**(4): p. 479-82.
4. Yassin, M.S., et al., *Evaluation of latex allergy in patients with meningomyelocele.* Ann Allergy, 1992. **69**(1): p. 29-31.

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Riskfactors

Who is at risk for Latex allergy?

- **Emergency patients** or patients in the **trauma bay** due to *limited time* for screening, *lack of information* and urgent *need for action* [1]
- **Woman** during **cesarean delivery** and **sensitization** of the **newborn** after delivery [2]

1. Pryor, J.P., et al., *Anaphylactic shock from a latex allergy in a patient with spinal trauma.* J Trauma, 2001. 50(5): p. 927-30.
2. Peer, L., et al., *Evaluation of a prospectively administered written questionnaire to reduce the incidence of suspected latex anaphylaxis during elective cesarean delivery.* Int J Obstet Anesth, 2014. 23(4): p. 335-40.

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Riskfactors

Who is at risk for Latex allergy?

- **Surgeons, nurses, lab technicians**, face an **increased risk of developing a latex allergy** [1]
- Up to **12-17%** of Healthcare providers are affected by **contact dermatitis** or **hypersensitivity reactions** [2]

1. United States Department of Labor. Occupational Safety and Health Administration. Hospital eTool, healthcare wide hazards—latex allergy. https://www.osha.gov/SLTC/etools/hospital/hazards/latex/latex.html
2. American Latex Allergy Association. Statistics. http://latexallergy.resources.org/statistics

Pro & Contra

Non-Latex-free versus 100% Latex-free OR

Non-Latex-free OR	100% Latex-free OR
Provision of both Latex and Latex-free products	
Patient assessment for Latex allergy mandatory preoperatively	
Last minute OR rescheduling or cancelation	
Screening and surveillance Programs for Type I und IV Reactions	
Emergency Intervention Plan for Patients and Staff	

Overhead

Is a 100% Latex-free OR

really more expensive?

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A Cost-Savings **Case Study**

As published in OR Manager[1]

Facility: Sutter Health | Alta Bates Medical Center
Location: Berkeley, California

Q: Can converting to synthetic surgical glove lower hospital operating room costs?

A: Yes. Converting an OR department to synthetic surgical gloves reduces overall operating costs.
This case study has proven Alta Bates Medical Center significantly reduced overall OR operating costs by $74,542 (25%) after converting fully to synthetic surgical gloves.

"Alta Bates Medical Center's decision to convert their surgical gloves 100% to synthetic has significantly reduced overall costs, eliminated Type 1 NRL allergy events for both patients and staff, stopped NRL-related OR teardowns, and improved patient and staff safety."

1. OR Manager, "Can converting to synthetic surgical gloves lower hospital operating room costs?" May 2016. Available at http://www.ormanager.com/can-converting-synthetic-surgical-gloves-lower-hospital-operating-room-costs/

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OR Manager

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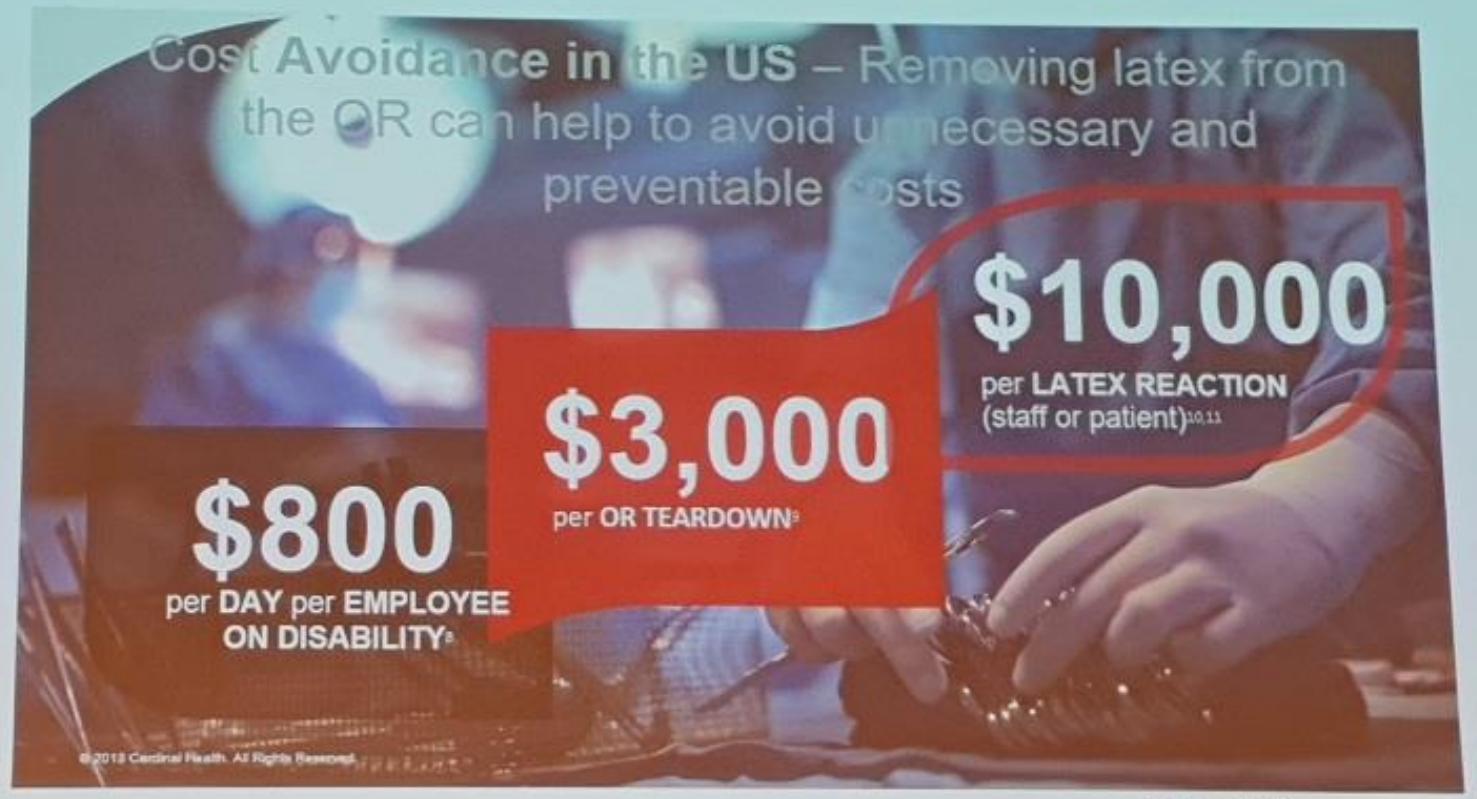

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8. Travel Staffing News, Stephen Halasnik, March 2010
9. Estimates from Donna McDaniel, Director Surgical Services and Carol Miller, Peri-operative Services Educator. Face-to-face interview, June 2011. http://ortoday.com/a-latex-free-approach-to-operating-room-savings/
10. Becker's Hospital Review, 11 Statistics on Average Hospital Costs per Stay, Medscape, Anaphylaxis Treatment & Management, S Shahzad, MD. Average cost per hospital stay: $10,000. http://www.beckershospitalreview.com/finance/11-statistics-on-average-hospital-costs-per-stay.html
11. "A hospital-based screening program for natural rubber latex allergy," Annals of Allergy, Asthma and Immunology Vol. 88, Page 560-567 (June 2002)

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Overhead

The "hidden cost"

- **Interruption** of OR-Schedule if Latex-Allergy is discovered at last minute
- **Additional effort** and **expenses** to change the OR set-up into Latex-free if not known before
- **Rescheduling** and **interruption** in the logistic chain
- **Absence of OR-Staff** due to illness or rehabilitation

Myths and Opinions

Alright, but Latex-free gloves …

… offer *less protection and puncture resistance* as natural Latex gloves!

Myths and Opinions

Alright, but Latex-free gloves ...

Failure rates in nonlatex surgical gloves

Denise M. Korniewicz, DNSc, RN, FAAN,[a] Laurel Garzon, DNSc, RN, CPNP,[b]
Judy Seltzer, MS, RN, CNOR,[c] and Manning Feinleib, MD, DrPH[d]
Coral Gables, Florida; Norfolk, Virginia; and Baltimore, Maryland

Background: The purpose of this study was to compare the frequency of glove defects for nonlatex surgical gloves while surgeons performed routine surgery and to evaluate surgeons' satisfaction with nonlatex sterile gloves.

Methods: Two brands of latex gloves and 6 brands of nonlatex gloves were tested. Gloves were collected at the end of each surgical procedure and tested for visual defects and barrier integrity using an automated calibrated water test machine consistent with FDA's recommended standards. A total of 6386 gloves used by 101 surgeons and 164 residents representing 15 surgical services were included in the analysis.

Results: Higher after-use defect rates occurred in nonlatex surgical gloves than in latex gloves. Higher times of use were related to higher defect rates for some surgical specialties, and both surgeons and residents were less satisfied with nonlatex surgical gloves.

Conclusion: Intact latex and nonlatex surgical gloves provide adequate barrier protection. Nonlatex surgical gloves have higher failure rates and lower user satisfaction than latex gloves do. Both nonlatex and latex gloves should be changed after 2 to 3 hours of use because the barrier of either type of glove becomes compromised with extended use. (Am J Infect Control 2004;32:268-73.)

Korniewicz, D. M., L. Garzon, J. Seltzer and M. Feinleib (2004). "Failure rates in nonlatex surgical gloves." Am J Infect Control 32(5): 268-273.

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Myths and Opinions

Alright, but Latex-free gloves ...

Failure rates in nonlatex surgical gloves

Defect rates by surgical specialty and duration of use

Total glove defect rates (visible defects and water leaks) for all glove types for surgical services ranged from 3.1% (pediatrics) to 11.7% (oral surgery) (Table 1). Those surgical services with the highest rates of defects were oral surgery (11.7%), plastic surgery (10.7%) and dental surgery (10.1%). Those with the lowest were pediatrics (3.1%), thoracic and transplant (each 4.4%), general surgery (4.3%) and ophthalmic surgery (4.0%).

Kamerewicz, D. M., L. Garzon, J. Seltzer and M. Feinleib (2004). "Failure rates in nonlatex surgical gloves." Am J Infect Control 32(5): 268-273.

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Myths and Opinions

Alright, but Latex-free gloves …

… offer *less protection and puncture resistance* as natural Latex gloves!

… do *not* offer the same cutaneous *sensibility*!

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Myths and Opinions

RCS

GENERAL SURGERY

Ann R Coll Surg Engl 2011; **93**: 95–98
doi 10.1308/003588411X12851629108150

A comparison of the effect of different surgical gloves on objective measurement of fingertip cutaneous sensibility

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[4]Department of Outcomes Research, St George's Vascular Institute, London, UK

ABSTRACT

INTRODUCTION The prudent selection of surgical gloves can deliver significant efficiency savings. However, objective data are lacking to compare differences in cutaneous sensibility between competing gloves. Therefore, the present study examined the use of a single comparable model of sterile surgical glove from two competing providers, Gammex PF HyGrip® (Ansell Limited, Red Bank, NJ, USA) with Biogel® (Mölnlycke Health Care AB, Göteborg, Sweden).

SUBJECTS AND METHODS Cutaneous pressure threshold, static and moving two-point discrimination were measured as indices of objective surgical glove performance in 52 blinded healthcare professionals.

RESULTS The mean cutaneous pressure threshold was 0.0680 ± 0.0923 g for skin, 0.411 ± 0.661 g for Ansell gloves and 0.472 ± 0.768 g for Biogel gloves. Skin was significantly more sensitive than Ansell ($P < 0.0001$) or Biogel ($P < 0.0001$) gloves (Wilcoxon signed rank test). There was no statistical difference between Biogel and Ansell gloves ($P = 0.359$). There was no significant difference between static or moving 2-point discrimination of skin and Ansell gloves ($P = 0.556$, $P = 0.617$; Wilcoxon signed rank test), skin and Biogel gloves ($P = 0.486$, $P = 0.437$; Wilcoxon signed rank test) or Ansell and Biogel gloves ($P = 0.843$, $P = 0.670$; Wilcoxon signed rank test).

CONCLUSIONS No demonstrable objective difference was found between competing gloves in the outcome measures of cutaneous sensibility and two-point discrimination. However, a difference in subjective preference was noted. Untested factors may underlie this discrepancy, and further research should employ more sophisticated measurements of surgical performance using competing models of surgical glove.

Bucknor, A., A. Karthikesalingam, S. R. Markar, P. J. Holt, I. Jones and T. G. Allen-Mersh (2011). "A comparison of the effect of different surgical gloves on objective measurement of fingertip cutaneous sensibility." Ann R Coll Surg Engl 93(2): 95-98.

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Discussion

Let's think about

- Are *all* **patients** routinely **screened** for Latex hypersensitivity?
- Do you have a **Latex-Policy**, **Latex-Screening-Program** for healthcare providers and a **Latex-Emergency-Plan**?
- **Are** all Latex-free **medical supplies** *always* quickly available?
- Is it *necessary* to keep **dual storage** of Latex and Latex-free products?

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Conclusion

- Latex-free gloves have a similar molecular structure than regular gloves and therefore
  - similar **fit, feel and comfort**
  - **barrier function** and **protection**

- *All interventions* in **infants and children** should be performed *latex-free*

- *Latex-free* environment is a precondition of **save care** for our **patients** and **healthcare providers** themselves

Images: Cardinal Health, Protexis® PI Micro Surgical Gloves

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Thank you for your attention

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