

Latex Allergies: A Review of Recognition, Evaluation, Management, Prevention, Education, and Alternative Product Use

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Objectives: To provide information about latex allergies; to determine how to recognize, evaluate, and manage emergencies related to latex allergies; and how to identify those at risk for latex allergies. Additionally, ways to prevent latex exposure, to educate health care workers and athletes about latex allergy, and to provide safe alternatives to latex are investigated.

Data Sources: We searched MEDLINE and SPORT Discus for the years 1998–2002 using the key words *latex*, *allergies*, *rubber*, *anaphylaxis*, *gloves*, *cross-reaction*, *IgE (immunoglobulin G) proteins*, and *radioallergosorbent test (RAST)*.

Background: Latex, a sap from the rubber tree, is found in many products used in everyday life. Latex is composed of compounds that may cause an allergic reaction, whose severity can range from irritant dermatitis to type IV dermatitis to type I systemic reaction. Recognition of the signs and symptoms associated with these reactions by the health care professional

may help to prevent a more severe reaction from occurring. Reactions can be complicated by contact with other substances, thus causing a cross-reaction. Some individuals are more at risk of latex allergies due to repetitive exposure to latex through their career paths, multiple surgeries, other allergies, or respiratory conditions. Management of an acute reaction involves removal of the irritant, cleansing of the affected area, monitoring vital signs for changes, and seeking additional medical assistance as warranted.

Recommendations: Those at risk may be identified through a thorough medical history and allergy testing. Prevention techniques and guidelines are examined, with an emphasis on education at multiple levels. Product information for nonlatex equipment and supplies for the athletic training room is offered, with additional resource information provided.

Key Words: athletic injury, RAST, gloves, cross-reaction, IgE antibodies, fruit

An injured athlete approaches the certified athletic trainer with a laceration on the dorsum of the hand that is bleeding mildly. The athletic trainer, in accordance with universal protocol, puts on latex gloves, cleans the wound, applies skin-closure tapes, covers the wound with a bandage, and disposes of wastes appropriately in a biohazard container. Within 15 to 20 minutes, the athlete experiences pruritis (severe itching)¹ with measurable wheals and erythema¹ at the site of the tapes and the bandage. The athlete has a runny nose, itchy and watery eyes, and a tickle in the throat with a cough. These signs and symptoms were not previously noted and developed after the injury. What is happening? Is it an allergic reaction? What should be done now?

The purpose of this review is to provide information about latex allergies; how to recognize, evaluate, and manage emergencies related to latex allergies; and how to identify those at risk of latex allergies. In addition to identifying the condition, ways to prevent or decrease one's exposure to latex in the athletic training room are considered.

DEFINITIONS AND TYPES OF LATEX ALLERGIES AND REACTIONS

Latex is a natural sap of the rubber tree (*Hevea brasiliensis*) that coagulates on exposure to air.¹⁻¹⁵ This sap is used to make natural rubber, which is found in more than 40 000 industrial products in the United States.^{9,16-20} Approximately 400 such products are used in the medical community.²¹ These products are composed of 2 types of substances that may cause medical problems: added chemical antioxidants and natural proteins associated with immunoglobulin E (IgE)-mediated reactions.^{16,19,22} The chemical antioxidants may cause type IV dermatitis reactions, and the natural proteins may cause type I systemic allergic reactions in some individuals.^{5,6,14,20,23,24}

Irritant dermatitis is a nonallergic, localized inflammation of the skin (redness, itching, various skin lesions) caused by chemical irritation that does not involve the immune system.²⁴ The irritation allows the latex allergens easier access into the body.^{15,20,23,25-27} Type IV dermatitis is limited to the skin and is a chemical contact inflammation (redness, itching, various skin lesions) that is a T-cell (immune system)-dependent re-

action caused by chemicals used in latex production.^{17,24} Typically, direct physical contact with a substance containing latex allows increased access for proteins to enter the body. Repeated exposures decrease tolerance and increase the likelihood of a type I reaction.^{8–11,14–16,23,25}

A type I systemic reaction is a true hypersensitivity reaction moderated by the development of IgE antibodies to specific proteins in latex, causing a serious and potentially lethal reaction.²⁴ For some sensitive individuals, it may be associated with cross-reactivity to certain foods.²⁸ The reaction is due to the immune response, which causes mast cells and basophils to release histamine, leukotrienes, prostaglandins, and kinins. Signs and symptoms may range from rhinitis to death.^{8–10,14–16,20,25} Type I conditions are categorized by 5 stages:

Stage 1—local urticaria (a vascular reaction of the skin characterized by sudden general eruption of wheals or papules that itch)¹ in the area of contact.^{20,23}

Stage 2—generalized urticaria with angioedema^{20,23} (swelling of skin tissue, mucous membranes, or viscera associated with specific antigen sensitivity).¹

Stage 3—urticaria with asthma, eye or nose itching, and gastrointestinal symptoms.^{20,23}

Stage 4—urticaria with anaphylaxis^{20,23} (a hypersensitivity reaction to an antigen, which is mediated by interactions between factors released by mast cells and IgE proteins capable of acting as antibodies that attach to mast cells in the respiratory tract and intestinal tract and play a major role in allergic reactions; these interactions produce the antigen-antibody reaction).¹

Stage 5—chronic asthma and permanent lung damage.²³

Recognition and Evaluation

Prevalence and At-Risk Individuals. Latex can enter the body through mucous membranes,^{7,15,17,27–29} contact with the skin,^{17,25,27,29} open wounds, contact with internal organs (as in surgery),²⁵ intravenous exposure, and inhalation of or contact with latex powder.^{11,16,17,25,26,29} The incidence of latex allergies has increased for health care workers in the last 10 years because of the institution of mandatory universal precautions for handling bodily fluids.^{6,10,16–18,21,28,30,31} In the health care profession, latex particles from the powder used inside gloves as a drying agent can spread through the air and be inhaled.^{4,32} The powder binds with the latex and becomes the carrier of latex molecules when released into the air.^{8,20–22,28,33,34} Mineral talc was used in gloves until 1940, when it was replaced with cornstarch because the mineral talc binds more firmly to latex molecules. Although mineral talc is heavier and less frequently airborne than cornstarch, it produces a more severe reaction in latex-sensitive individuals. The airborne particles, regardless of the powder used, can enter a person's lungs and mucous membranes, causing an allergic reaction.^{2,6,31,35,36}

The increasing prevalence of latex sensitivity is not only seen in the health care profession but also in children with spina bifida,^{7,15,17,20,29,37,38} latex-industry workers,^{7,22–24,27} those who have undergone multiple surgeries (especially on the urinary tract),^{15,17,19,24,28,29,38} blood donors, individuals with a history of allergies,^{7,29,30,37} and those who have recurrent contact with latex.^{2,11,14,18,21,33} The rate of occurrence of latex allergy for children with spina bifida, due to multiple surgeries and congenital denervation of mast cells,³⁷ ranges

from 12% to 73%.^{29,37,38,39} Prevalence is reported to be 3% to 17% in health care workers,^{10,24,28,32–34,37–39} 11% in latex-glove-plant workers,^{7,14,22} and 1% to 6.5% in the general population.^{2,9,19,40,41}

Signs and Symptoms

An immediate allergic reaction may occur within minutes of coming into contact with latex. Symptoms of a reaction include hives; wheezing; coughing; shortness of breath; sneezing; nasal congestion; runny nose; conjunctivitis (red, itchy, watery eyes)¹; nasal, palatal, or ocular itching; urticaria; nasorhinitis (chronic runny nose)¹; asthma; and hypotension.^{18,22,30,31,33,42–45} Hives can appear anywhere on the body and not necessarily at the point where direct contact with the latex occurred.¹⁷ The immediate reactions can “develop into a life-threatening condition when blood pressure drops, airways become blocked, and the throat closes.”¹⁷ This condition can eventually progress into anaphylaxis.^{17,21,26,28,33,42}

These symptoms can be exacerbated in certain people when specific foods are ingested.^{40,46} Latex can cross-react with the heveamine in fruits and may cause an immediate and more serious reaction. A person who comes in contact with latex may sustain a mild allergic reaction. However, when later ingesting a cross-reacting food, new reactions can occur within 5 to 30 minutes, resulting in itching and irritation of oral tissues, swelling of the lips and tongue, and sometimes papules or blistering of these tissues.⁴⁷ The allergens can cross-react after either latex exposure or ingestion of certain foods.⁴⁶

Other Associated Allergies

Allergy to latex rubber involves sensitization to multiple constituent proteins; therefore, different groups of patients respond to specific latex proteins in various ways.^{6,7} These groups of proteins are found in many products, including, but not limited to, certain tree pollens, some plants, and (most commonly) fresh fruits.^{6,47,48} Fresh fruits that commonly cause hypersensitivity when associated with latex proteins are avocado, banana, celery, chestnut, and pear. Less common culprits are apricot, buckwheat, cherry, fig, grape, kiwi, mango, melon, nectarine, orange, papaya, passion fruit, peach, peanut, pineapple, plum, potato, tomato, and walnut.^{7,39,40,44} The problem manifests itself in 2 ways: (1) the fruit allergy triggers previously undiagnosed recognition of the latex allergy or (2) after years of latex exposure and latex sensitivity, the person develops fruit allergies.⁶ Whether this dual latex-fruit sensitivity is determined by common antigens or cross-reacting antigens has yet to be determined.⁷

CASE STUDIES

As an athletic trainer, recognizing and evaluating the latex-sensitive individual is important to maintaining safety and preventing serious reactions. It may be the athlete or another athletic trainer who has a sensitivity reaction that needs to be managed and treated. A number of cases of latex-sensitivity reactions have been documented in the literature.^{7,18,27,30,31,44,49–54} Four such cases representing the allied health professions and 1 in athletics follow.

Case 1

A 35-year-old female laboratory technician wore latex gloves for approximately 13 years. She stopped wearing latex

gloves after developing sneezing, pruritus, conjunctivitis, and facial angioedema (facial swelling)¹ but continued working with colleagues who wore latex gloves. She was sent to an outpatient facility because of chronic rhinitis with sneezing, nasal congestion, and a runny nose. She underwent a radio-allergosorbent test (RAST), which identifies specific IgE antibodies in the blood,^{22,25} with positive results for latex and banana.³¹

Case 2

A 23-year-old female nurse's aide with 3 years' experience was assessed with recurrent anaphylaxis preceded by chronic rhinitis and conjunctivitis for approximately 1 month. The first reaction occurred after she wore latex gloves. After this reaction, she stopped wearing the gloves, and her symptoms decreased. The second and third incidents occurred after eating cherries and a banana, respectively. After these incidents, the patient avoided latex gloves. However, when she came back into contact with latex products at a later date, she experienced severe rhinoconjunctivitis with urticaria and dyspnea.¹ Allergy testing showed increased sensitivity to latex. The saline test solution produced no symptoms, whereas the latex solution produced a reaction within 5 minutes.³¹

Case 3

A 25-year-old female laboratory technician experienced intermittent asthma and allergic rhinitis for 3 years. She wore latex gloves at work and began noticing hives on her hands after sweating in the gloves. Also, she experienced vaginal pruritus and soreness after intercourse using a latex condom. Ten minutes into her cesarean section, which was being performed by a surgeon wearing latex gloves, she experienced a severe drop in blood pressure. Heart rate increased, and signs of asthma, difficulty breathing, and nasal congestion were present. At that point, she received treatment for her reactions, and improvement was noted. After surgery, the patient was evaluated and found to have a positive RAST for latex.³⁰

Case 4

A 25-year-old female squash player had a history of allergic rhinitis for 13 years, neurodermatitis for 18 months, and 5 previous surgeries. She suffered a severe anaphylactic reaction with generalized urticaria during the most recent surgery. The reaction was successfully treated, but the reason for anaphylaxis remained unclear. She had an ongoing case of contact dermatitis after wearing latex gloves the previous 2 months. On the day she presented in the emergency room with a severe anaphylactic shock reaction, she had just finished playing a game of squash. Within 10 minutes after the match was completed, her hands and feet swelled and she experienced periorbital tingling and dizziness. She lost consciousness for a short time and was admitted to the hospital but was treated and released the next morning. Follow-up allergy testing revealed positive skin-prick tests to several extracts of latex and latex gloves. It was determined that the latex in the handle of her squash racquet, in combination with the ball and the dust from the squash courts, elicited the latest anaphylactic reaction.⁵⁵

Case 5

A 41-year-old female registered nurse suffered multiple, unidentified allergic reactions at work that continued for years. Her first severe reaction occurred after visiting a family member in the hospital. She developed breathing difficulties so intense that she was required to spend 3 days on a ventilator. At that time, it was assumed that her reaction was due to the cleaning agents used in the hospital. It was later determined that the cleaning agents had only served to make latex particles more airborne, therefore contributing to her allergic reaction. Whenever she changed jobs, she informed her supervisors of her allergy and was supplied with nonlatex gloves. Her co-workers, however, continued to use latex gloves throughout the hospital. At times, she would run out of the hypoallergenic gloves and revert to latex gloves, which always provoked an allergic reaction. Her last episode occurred after she wore latex gloves and developed anaphylaxis. She was rushed to the emergency room, where she informed medical personnel that she was latex sensitive. The staff treating her continued using the latex gloves, resulting in the death of the patient 40 minutes after first entering the emergency room. Postmortem blood tests found high levels of latex antibodies in her bloodstream.⁵²

MANAGEMENT

Management of latex allergies consists of treating an emergency, screening for the condition, and preventing reactions and situations from occurring in the first place. Three main levels of allergic reactions, as previously defined, are associated with latex. Therefore, treatment ranges from simple to emergent-care procedures.

For irritant dermatitis, remove the irritating substance, cleanse the area with soap and water, apply topical corticosteroids to reduce the inflammatory response, use hydrating creams after water contact, use hydrating creams overnight covered by cotton gloves, and recommend evaluation by a dermatologist for allergic contact dermatitis.^{20,23,24,26,53}

For type IV dermatitis, follow the same procedure as described for irritant dermatitis. The patient should now obtain a serum test for latex IgE.^{20,23,24}

For type I systematic reaction, remove the irritating substance, treat life-threatening conditions first (follow the ABCs of cardiopulmonary resuscitation), cleanse the area of contact with soap and water if possible, transfer to a medical facility, monitor vital signs, and continue to administer emergent care as needed.^{20,23,24}

SCREENING

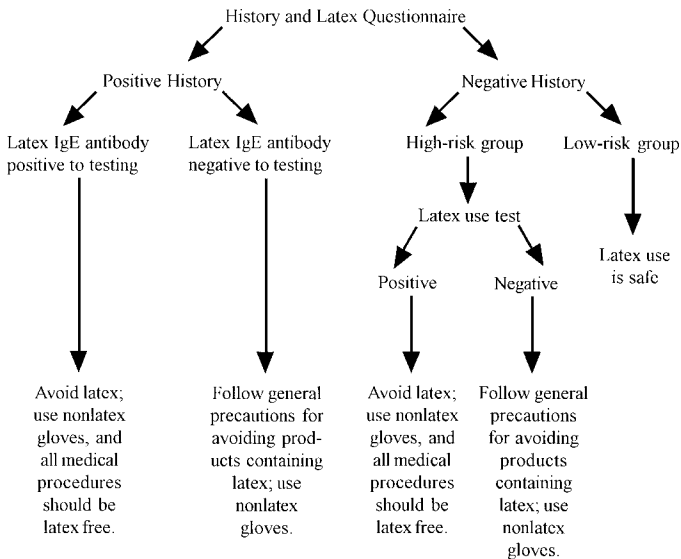
The first step in prevention is to identify individuals susceptible to latex allergies. It is essential to obtain a thorough medical history and physical examination to initially identify at-risk individuals^{9,14,15,20,23,25-27,33} (Table 1). After screening, further assessment and management are determined by whether the history was positive or negative and whether the person is in a high- or low-risk group^{9,15} (Figure). Several latex-sensitivity tests are used in the United States today.

Skin-Patch Test

This test is used for irritant and contact dermatitis. A patch with immunogenic rubber chemicals is taped on the person's

Table 1. Screening Questionnaire

Are you allergic to rubber or latex products? ⁴	Yes	No
Have you ever developed hives under latex gloves? ⁴	Yes	No
Have you ever experienced coughing, wheezing, shortness of breath, or itching immediately after exposure to latex in the home or at work? ^{23,35}	Yes	No
Have you ever had rhinitis or conjunctivitis? ²³	Yes	No
Have you experienced hives, itching of the lips or throat, or more severe symptoms when you handle or eat apple, apricot, avocado, banana, carrot, celery, cherry, chestnut, fig, grape, kiwi, melon, nectarine, papaya, passion fruit, peach, pear, plum, pineapple, potato, or tomato? ²³	Yes	No
Have you ever experienced swelling or itching of the mouth after a dental exam? ^{23,35}	Yes	No
Are you exposed to latex on a regular basis? ¹⁶	Yes	No
What surgeries or invasive medical procedures have you had? ²³ _____		
If exposed to latex on a regular basis, in what type of setting? ⁴ _____		
What type of latex or rubber products do you use? _____		



Latex screening and management.^{9,26}

skin for 48 to 96 hours and then interpreted using standardized techniques.^{4,5,8,10,17,20,25,26}

Skin-Prick Test

This test is used for type I latex-sensitivity diagnosis. To perform the test, a drop of latex extract is placed on the skin, and the skin is scratched with a sharp, bifurcated needle. The person is monitored for signs of an allergic reaction.

Intradermal Test

This test is used for type I latex-sensitivity diagnosis. A needle containing latex solution is inserted into the skin. Reactions are monitored because this test generates a higher level of allergic reactions than a skin-prick test. It should be performed in a facility with emergency medical equipment available to handle an anaphylactic reaction.^{8,22,54,56,57} Currently, the Food and Drug Administration has not approved a latex extract for the skin-prick or intradermal tests. Typically, a powdered latex glove is cut into an 8- × 8-cm square patch and soaked in 10 mL of extraction fluid overnight. Then it is passed through a sterile Millipore filter (Millipore Corp, Bedford, MA) and diluted to 1:10, 1:100, and 1:1000 for testing.⁵⁸ Research is being conducted on a standardized, nonammoniated latex extract (Greer Laboratories, Lenoir, NC) for skin-

prick tests. The early results show safety (by not causing an anaphylactic reaction) and true-positive results for latex allergy of 95% with the 100 mcg/mL concentration and 99% positive results with the 1 mg/mL concentration. Similarly, the true-negative results were 100% with the 100 mcg/mL and 96% negative results with the 1 mg/mL concentration for those without latex allergy.⁵⁹

IgE Antibody Immunoassays

These are methods used to identify the IgE antibodies in the serum and to confirm the diagnosis of latex sensitivity. However, a negative latex-specific IgE test does not rule out a latex allergy.^{5,8,56,57} Several methods are described in the literature, including RAST, enzyme-linked immunosorbent assay, AlaSTAT (Diagnostic Products Corp, Los Angeles, CA), ImmunoCAP (Pharmacia Corp, Peapack, NJ), and HY-TEC (Hycor Biomedical Inc, Garden Grove, CA). In one study, the AlaSTAT and CAP assays produced 24% and 27% false-negative results, respectively, whereas the HY-TEC produced a 27% false-positive result when compared with the skin-prick test.⁶⁰ In another study, combining assays raised the diagnostic sensitivity compared with using 1 in vitro test alone.⁵⁶ Others have indicated that the assays may lack sensitivity in patients presenting with urticaria only.⁶¹

Use Test

This test is performed when the immunoassay tests are negative, but the history of symptoms is compelling. A fingertip is cut from a latex glove, dampened with water, and placed on the person's finger for 15 minutes. A positive test results in urticaria with itching or erythema. If no reaction occurs, placing an entire dampened glove on the hand for 15 minutes or until a reaction occurs is considered safe.^{20,26,62}

PREVENTION

Currently, as with other allergies, there is no cure for latex sensitivity. The only way of decreasing the allergic reactions is to avoid exposure to latex.^{2,14,17,19,21,25} High-risk areas should be identified so they can be avoided.^{5,11,22,26,34} Areas subject to high-volume use of latex products include blood banks and medical laboratories. However, many items contain latex; therefore, it is imperative that the allergy-sensitive health care worker or patient be familiar with the diverse sources of latex.^{25,27} A number of steps can be taken to avoid exposure, the first being finding safe alternatives.⁶³ Latex-free alterna-

tives include nitrile, vinyl, neoprene, styrene butadiene, and Tactylon (Tactyl Technologies, Inc, Vista, CA).^{21,25} Although these alternatives exist, it is sometimes necessary to use latex products. In this case, the following steps should be taken:

- Use topical barriers.^{2,4,25,26}
- Use cotton glove liners.^{4,21,25}
- Wash hands immediately after glove use or contact with other latex products.^{4,21,25,27}
- Use nonpetroleum-based moisturizing agents, especially over cuts or cracks in skin.⁴
- Avoid touching the mucous membranes during or after contact with a latex product.^{4,21}
- Eliminate unnecessary latex-glove use, and remove the gloves frequently to reduce hyperhydration or excessive occlusion.²⁶
- Make sure ventilation is adequate where these products are used and that air filters are changed or cleaned frequently.^{5,26,27}
- Avoid exposure to people and objects (countertops, drawers, computer keyboards, and telephones) that have come into contact with latex products.²⁶
- Avoid using detergents, alcohol, formaldehyde, and antimicrobial agents, usually in the form of hand washes or hand rubs, which may increase latex sensitivity.³⁴

Those who exhibit symptoms of severe hypersensitivity, including anaphylaxis, should carry and know how to use an Epi-Pen (Dey, Napa, CA). MedicAlert jewelry (MedicAlert Foundation Intl, Turlock, CA) should also be worn.^{2,4,5,11,14,21,26}

AVOIDANCE AND EDUCATION

Programming and Education

Education is key in controlling allergic reactions. The first level of education lies with the latex-sensitive individual. The person who is diagnosed with latex sensitivity needs to be educated on the condition and understand prevention and avoidance techniques.⁶³ The second level of education is for the individual to notify his or her employer of the condition, so latex-free alternatives can be made available.^{4,25,26} The third level of education involves the employer specifically. Employers must establish policies and procedures to ensure the safety of the latex-sensitive person.²⁷ All other employees must be informed of practices to prevent exposure to latex and to recognize the signs and symptoms of an allergic reaction.^{9,25,26} Employers also need to conduct worksite evaluations to identify areas of potential problems.^{27,63}

The same 3 levels of education apply to an athlete in the athletic training room setting. As health care providers, athletic trainers are obligated to develop guidelines from recommendations that provide a balance between the risk of communicable disease transmission and latex-hypersensitivity reactions.^{5,21,25}

To help reduce the occurrence of latex allergies among health care workers and patients, the American College of Allergy, Asthma, & Immunology established new practice guidelines⁴:

- Develop educational programs to promote awareness of the allergy.
- Encourage manufacturers of products that contain latex to label them accurately.

- Fund projects to develop an adequate alternative to rubber products.
- Establish standards for the maximum level of allergens permitted in latex gloves.
- Develop an improved and more time-efficient method for the diagnosis of latex allergies.⁴

Within the educational framework, there should be more publicity and time spent understanding latex allergies. The employer should conduct inservice training for athletic training and associated personnel (teachers, coaches, etc) responsible for administering first aid. Information sessions for athletes and parents concerning the possibility of latex sensitivity should also be provided.¹⁶ This will help increase the awareness of potential latex sensitivity with product use.

Product Information

The athletic training environment has many known and hidden latex products. Creating a completely latex-free facility may be unrealistic at this time. Products that contain latex, including adhesive bandages, elastic wraps, and Thera-band tubing (The Hygenic Corp, Akron, OH), are used daily in the athletic training room. It would be beneficial to an athletic training program to provide a medical kit with latex-free products. Although this approach may seem expensive at first, a life may be saved if an athlete or athletic trainer has a sensitivity or reaction to latex.^{11,13,19,25} Several alternatives are available to the latex products commonly used in the athletic training facility^{16,64–66} (Table 2). Other products containing latex that an athlete may use include tight-fitting workout clothing, goggles, bathing caps, water shoes, balls, and racquet handles.^{67,68}

Resource Information

Several Web sites offer information on latex allergies, including current clinical management and prevention of allergic disorders. Answers to frequently asked questions, educational resources, and alternative products are available.⁶⁹

- American Academy of Allergy Asthma & Immunology (AAAAI), <http://www.aaaai.org>.
- American Association of Nurse Anesthetists (AANA), <http://www.aana.com/crna/prof/latex.asp>.
- American College of Allergy, Asthma, & Immunology (ACAI), <http://allergy.mcg.edu/physicians/ltxhome.html>.
- American Latex Allergy Association and A.L.E.R.T., Inc, <http://www.latexallergyresources.org>.
- Latex Allergy Information Resource (LAIR), <http://www.anesth.com/lair/lair.html>.
- National Institute for Occupational Safety and Health (NIOSH), <http://cdc.gov/niosh/latexpg.html>.
- National Latex Allergy Network (NLAN), <http://www.latex-allergy.org>.
- Occupational Safety and Health Administration (OSHA), <http://www.osha-slc.gov/SLTC/latexallergy/index.html>.
- The Allergy Report, <http://www.theallergyreport.org>.

CONCLUSIONS

The opening scenario presented an athlete with pruritis, erythema, runny nose, itchy and watery eyes, and a tickle in the throat with a cough. If the reader suspected an allergic reaction to latex, that is correct. To manage this condition, remove the

Table 2. Latex-Free Alternatives⁶⁴⁻⁶⁶

Product Type	Product Name or Generic Alternative	Manufacturer
Ambu bags	Bag Easy Capno-Flo SPUR	Respironics, Murrysville, PA Nellcor Puritan-Bennett Inc, Carlsbad, CA Ambu Inc, Linthicum, MD
Bandages	Active Strips (check for latex in packaging) Sterile dressing with latex-free tape	3M, St Paul, MN
Blood pressure cuffs, tubing	Cleen Cuff Dinamap Perfect Balance Webril Use over clothing Stockinette	Vital Signs, Inc, Totowa, NJ GE Medical Systems, Waukesha, WI Trimline Medical Products Corp, Branchburg, NJ The Kendall Co, Walpole, MA
Cohesive bandages	CoFlex	Andover Coated Products, Salisbury, MA
Cold and hot therapy products	Technol	Technol Orthopaedic Products, Fort Worth, TX
Cardiopulmonary resuscitation mannequins	Little Anne, Resusci Anne	Laerdal Medical Corp, Wappingers Falls, NY
Crutches' axillary and hand pads	Cover with cloth or tape	
Dressings	Bioclusive Comfeel Plus DuoDerm Metalline Opsite Reston Self-Adhering Foam Veni-Gard Webril Xerofoam	Johnson & Johnson, New Brunswick, NJ Coloplast Ltd, Peterborough, UK ConvacTec, Princeton, NJ Lohmann & Rauscher Smith + Nephew, Hull, UK 3M Lohmann & Rauscher GmbH & Co, Rengsdorf, Germany The Kendall Co The Kendall Co
Elastic wraps	Adban Cohesive Compression Bandage CEB Champ Elastic Wrap Comprilan X-Mark	Avcor HealthCare, Fort Worth, TX Hartman-Conco Inc, Rock Hill, SC Cramer Sports Medicine, Gardner, KS JOBST, Charlotte, NC Avcor HealthCare
Electrode bulbs, pads, grounding*		Baxter Intl, Round Lake, IL Conmed, Utica, NY Vermont Medical, Inc, Bellows Falls, VT Valleylab, Boulder, CO Medtronic, Minneapolis, MN Staedyn EMS, Longmont, CO
Gloves	Allerderm Nitrile Allergard Dermaprene Duraprene N-DEX Neolon PF Nitrile Pure Advantage Sensicare Surgicare TACTYLON Tru-Touch Vinyl Neoprene	Allerderm Laboratories, Petaluma, CA Johnson & Johnson Ansell Limited, Red Bank, NJ Allegiance Healthcare Corp, McGaw Park, IL Best Manufacturing, Menlo, GA Maxxim Medical, Waltham, MA Magid Glove and Safety Manufacturing Co, Chicago, IL Tillotson Healthcare Corp, Dixville Notch, NH Maxxim Medical Tactyl Technologies, Inc, Vista, CA Becton, Dickinson and Co, Franklin Lakes, NJ
Ice wraps	ProPac	ProPac, Inc, Charleston, SC
Peak flow meters*		Respironics Healthscan, Cedar Grove, NJ
Resistance tubing	Rolyan Cover with cloth or exercise putty	Rolyan Ability One, Germantown, WI
Rubber reflex hammer Stethoscopes	Cover with plastic bag Littman Scopecoat Cover tubing with stockinette	Armstrong Medical Industries, Inc, Lincolnshire, IL Devtron, Phoenix, AZ
Tapes	Dermicel Durapore Microfoam Micropore Scanpore Transpore	Johnson & Johnson 3M 3M 3M Hermal Kurt Herrmann GmbH & Co, Reinbek, Germany 3M

*Individual products not listed. Please check with manufacturers for details.

skin-closure tapes and bandage using nonlatex gloves. Wash the area and dry it. If the bleeding has stopped, a topical corticosteroid cream should be placed on the area of irritation. The wound should then be bandaged with nonlatex products and the athlete monitored for other signs and symptoms of a more severe reaction. If the wound is still bleeding, gauze should be applied using nonlatex products and direct pressure. Treat the skin irritation after the bleeding has subsided. After this reaction, the athlete should be instructed to avoid fruits for the next 24 hours and to discuss the extent and severity of the allergic response with a physician. The athletic trainer should document the incident and follow up with the athlete to ensure adequate medical care. Education is the key to responding and reacting to emergencies as they are presented. Prevention is essential for decreasing the chance of an allergic reaction to latex.

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