Utilization of Latex Protective Barriers in Combination with Petroleum- or Vegetable-based Lubricants by Massage Therapists

A study conducted by Lynne McKenzie, Matthias Mann and Pierre Wust,
students at the Atlantic College of Therapeutic Massage,
Fredericton, NB, Canada

For

Nadine Currie-Jackson

June 6, 2005

BACKGROUND

The purpose of this study was to determine the awareness that massage therapists have of the potential risk associated with the use of latex gloves or finger cots with massage lotion.

The study came about following the presentation by a representative of a local HIV/AIDS Association at the Atlantic College of Therapeutic Massage (www.actmonline.com/). During her presentation, she reiterated the well-publicized hazards of using non-water-based lubricants with latex condoms. Following this presentation, the College immediately banned the use of latex gloves and finger cots. But it also raised another question. How many massage therapists are aware of this problem?

Over the course of our investigation into the use of latex gloves and finger cots in combination with lubricants, vinyl gloves—which are traditionally used to replace latex—are even worse as far as permeability and damage from lubricants are concerned.

Information on the use of latex, vinyl and nitrile gloves, as well as on their proper storage and handling, is presented in Appendix A.

METHOD

A number of considerations came into play regarding the way in which to contact massage therapists for this survey:

- accessibility
- ease of contact
- ease of response
- cost
- time restraint

Ultimately, it was the use of email that fulfilled all the criteria outlined above. Email addresses were gathered from a variety of sources such as massage therapy websites, associations and magazines.

However, using only email addresses as a means of contacting individuals puts obvious limitations on the validity of the survey. While this survey may not be sound from a purely scientific point of view, it will nonetheless give a good snapshot of the described problem.

In an effort to keep the survey blind to the individuals assessing the results, it was setup so that the responses could not be traced back to the senders. This concern was also addressed in the disclaimer at the end of the question page (Appendix C).

Appendix B presents a template of the email which was sent on Saturday, April 30, 2005. Each of the English and French segments was divided into two sections. The first part explained the reasons for the survey and urged the recipients to click on the hyperlink http://actmonline.com/survey.html. This link would take them to the question page presented in

Appendix C. The second part of the each segment of the email urged the recipients to click on the hyperlink http://actmonline.com/lotion_and_oil.html. This link, which was only activated on May 8, 2005, would take them to the web page that outlined the reasons for the survey and gave them links to websites dealing with the risks connected with the use of latex with lubricants. This link is shown in Appendix D.

RESULTS

All raw data is presented in Appendix E.

The total number of emails sent was 817. About 20% or 165 emails were, for a variety of reasons, not deliverable. This left 652 potential replies. The actual number of replies was 44—about 7% (Table 2).

The majority of emails (41%) were sent to Ontario, followed by New Brunswick (19%), Nova Scotia (12%), British Columbia (10%), Quebec (7%) and Alberta (6%). At least one massage therapist from each province and territory was contacted by email, except for the Territory of Nunavut (Table 3).

Relative to the number of emails sent, out of the 44 respondents, 34% came from Ontario, 20.5% came from New Brunswick, 16% from British Columbia and 9% from Nova Scotia (Table 3).

It is difficult to establish the exact number of massage therapists who practice in Canada. By approximating the number, based on data from massage therapy associations or colleges from Newfoundland and Labrador, Prince Edward Island, New Brunswick and Ontario, the average percentage of massage therapists who were contacted was about 8.5%. Only about 0.6% of all massage therapists registered with an association or college responded (Table 2).

Of the 44 massage therapists who responded, 72% were female (Table 4).

The initial question email was sent on Saturday April 30, 2005. Most of the responses came in the following Monday (70.5%). Tuesday, May 3rd and Friday, May 6th were the next busiest response days with 11.4 and 9.1% respectively (Table 5).

The average age of massage therapists who answered was between 20 - 60 years of age (Table 6).

The greatest amount of responses was received from massage therapists in the 30 - 39 age group followed by the 40 - 49 age group (Table 6).

A majority of the respondents (57%) graduated between 2000 and 2004 (Table 6).

About 1/3 of the respondents did not know, or were not sure, whether the lotion they use was petroleum- or vegetable-based.

It was determined that 70.5% of massage therapists used vegetable-based lubricants and about 27% used petroleum-based lubricants (Table 7).

One massage therapist does not use lubricants and he did not specify whether he used anything else that would increase gliding, e.g., corn starch (Table 7).

There is an almost even spilt in the number of massage therapists who use exclusively vinyl gloves and those who use exclusively latex gloves, with the latex gloves having a slight lead (Table 8).

Only a minority (less than 7%) exclusively use nitrile gloves (Table 8).

About half of the respondents use latex finger cots (Table 8).

Some massage therapists professed to using waterproof band aid or liquid bandage when they were injured, but it was not clear whether they treated clients under these conditions. Other massage therapists said that they would not treat if they had an injury (Table 1b).

About 30% used latex gloves with vegetable-based lubricants and about 14% used them with petroleum-based lubricants. This adds up to 44% of the respondents using latex gloves with lubrication when treating their clients (Table 9).

About 27% of massage therapists used vinyl gloves with vegetable-based lubricants and approximately 7% used them with petroleum-based lubricants (Table 9).

Over 57% of massage therapists used either vinyl or latex gloves when treating their clients using vegetable-based lubricants (Table 9).

About 20% used either vinyl or latex gloves when treating their clients using petroleum-based lubricants (Table 9).

INTERPRETATION

Since we do not know the make up of the general massage therapist population, regarding female to male ratio, age, year of graduation, etc., it is difficult to speculate on the applicability of the results to the massage therapist population as a whole.

The number of massage therapists who have email addresses varies greatly from province to province. In addition, some associations provide the name; address and email address of their members whereas other associations make it more difficult to access/contact their members. In some cases massage therapy associations did not have a website (e.g., names from massage therapists from Nova Scotia were gathered from http://www.centurymedical.com website. This site was also a useful reference for Prince Edward Island and, Newfoundland and Labrador.

However, despite its limitations, this survey can provide valuable information on the awareness of massage therapists regarding the use of latex gloves in conjunction with non-water-based lubricants. When more than 2/3 of massage therapists practicing in Canada today use a protective barrier—which may not provide all the required protection from potentially harmful pathogens—there is a definite need for education regarding this subject.
It is worrisome that approximately 1/3 of respondents did not know what type of lubricants they were using (Table 7).

Over 30% said they used vinyl or another type of finger cot. To our knowledge, the only finger cots available are made of latex. The way our survey was setup did not allow us to inquire as to whether these massage therapists really used vinyl finger cots or whether they are mistakenly using latex finger cots (Table 8).

CONCLUSION

While the problem regarding allergic reactions to latex seems to have been widely publicized and acknowledged, the problem regarding the loss of protection when latex or vinyl gloves are used in conjunction with lubricants has not yet entered the consciousness of many massage therapists. Thus, the need for education regarding this matter is imperative. As the Atlantic College of Therapeutic Massage did, we believe that other massage therapy schools, colleges, associations and magazines should be at the forefront of this education program.

Over the course of our investigation into the problems of latex and lubricants, we also found that vinyl gloves are not a good replacement for latex as they can also break down when combined with oil-based lubricants. In addition, they do not offer the same wear comfort as both latex and nitrile does.

We hope that the massage therapists who use Band-aid or Liquid Bandage to cover cuts do not perform any treatments while they are still injured. These methods certainly do not provide the necessary protection.

Our research led us to believe that nitrile is the best alternative to latex or vinyl. Nitrile gloves are not affected by oils or alcohol and they are puncture resistant. While they do not fit as well as latex gloves, they are still comfortable to wear and are not bulky like vinyl gloves. There are generally no concerns regarding allergic reactions but it has to be kept in mind that it contains chemical accelerators.

We acknowledge that the breakdown of the protective barrier may be less of a concern for a massage therapist then it is for other healthcare providers, such as surgeons. However, it should be of paramount importance for every massage therapist to protect him/herself as well as the client from any potential infection, even if the risk of transmission is low.

REFERENCES

1. http://www.schoolhealth.com/shop/latexfree.asp
2. http://www.nursingworld.org/dlwa/osh/wp7.htm
3. http://www.absa.org/0112cdchand.html
4. http://www.endonurse.com/articles/4c1feat3.html?wts=20050203064142&hc=386&req=latex+and+gloves
5. http://www.infectioncontroltoday.com/articles/4a1feat1.html?wts=20050203064451&hc=2570&req=latex+and+gloves
6. http://www.infectioncontroltoday.com/articles/gloves.html?wts=20050203064451&hc=2570&req=latex+and+gloves
7. http://www.Pro2s.com/links/mainlink.htm#.Pro&Cons
8. http://www.immune.com/rubber/nr3.html
9. http://www.devicelink.com/mddi/archive/96/05/021.html
10. http://europa.eu.int/comm/health/ph_risk/committees/scmp/documents/out48_en.pdf

APPENDIX A: INFORMATION

Numerous studies[1-10], have shown that lubricants, whether petroleum- or vegetable-based can alter the integrity of latex and vinyl gloves, rendering their protection doubtful.

Latex

"This situation with medical gloves is similar to that which exists for condoms, where natural rubber latex has been the dominant material and where the need to protect against Human Immunodeficiency Virus (HIV) transmission has become of paramount importance[10]."

"In hand care, glove users with hand dermatitis should never wear oil-based salves or lotions (e.g. petrolatum, mineral oil, lanolin, coconut oil, palm oil, etc.) with latex gloves. Oil breaks down the glove barrier, and releases additional allergens. Non-oil-based products are compatible with latex. Glove users can wear oil-based products while away from work. Detergents and other chemicals similarly degrade latex[2]."

"Lastly, petroleum based products can break down latex and affect the barrier integrity of latex gloves. The use of petroleum based hand lotions by health care employees could allow the penetration of more pathogens to employee hands through breaks in glove material[3]."

"Truscott adds that HCWs should also beware of using hand lotions containing a significant percentage of petroleum-based oils known to deteriorate certain glove materials, such as natural rubber latex (NRL)[5]." Note: HCWs stands for Health Care Workers.

"Exposure to over-the-counter vaginal products containing mineral oil or vegetable oil decreases condom strength and potentially jeopardizes efficacy (Rosen and Rosen, 1999)[10]."

Vinyl

"Most studies demonstrate that vinyl medical gloves had more biological leakage than latex or nitrile medical examination gloves or latex surgical gloves[10]."

"About 90 percent of breaches and breaks in vinyl gloves, for instance, occur at the fingertips; they also occur between the first finger and the thumb[5]."

"The researchers found, "thin gloves manufactured from polyethylene or polyvinyl chloride (vinyl) are ineffective barriers, while gloves of thin latex are superior but not without failure[5]."

"In a series of studies, Korniewicz and co-workers have shown that vinyl gloves have higher leakage rates than latex (less barrier effectiveness), and are therefore less suitable for surgery[8]."

Nitrile

"Nitrile gloves are the best alternative to latex. Wava Truscott, PhD, director of scientific affairs and clinical education at Kimberly-Clark Health Care points out that nitrile is among the strongest materials available for exam gloves and is an excellent choice for most procedures.

Nitrile gloves are ideal for clinicians who are allergic or sensitive to latex and who perform tasks or procedures involving prolonged exposure to blood, body fluids, chemotherapeutic agents, cleaning solutions and other chemicals[4]."

"Most procedures that depend upon the latex barrier function are of sufficiently short duration for this diffusion process to be of no practical consequence. Of some clinical importance, however, is the fact that contact with certain chemicals may facilitate this process of diffusion through swelling or other processes[10]."

"Nitrile also has the benefit of being resistant to any breakdown from oil-based products," Truscott says. "Nitrile would be an excellent product to use if you are working with a lubricant, milking tubing or performing various procedures requiring contact with an oil-based substance, Oils can breakdown latex where you'll notice your fingertips getting tacky or elongated, whereas nitrile does not[4]."

"Nitrile gloves, by the way, are resistant to the oil[5]."

"Nitrile—A synthetic rubber material that offers resistance to a variety of chemicals and good resistance to abrasion. It makes a good general-duty glove[7]."

"Lotion compatibility—Most lotions should not be worn under gloves. Those that contain oil (mineral, jojoba, coconut, or palm), petroleum (gels and salves), or lanolin degrade latex and vinyl gloves, compromising barrier integrity[7, 8]."

"The major alternatives are nitrile, neoprene, styrene copolymers, plasticised PVC and polyurethane. Nitrile gloves are usually of lower tensile strength than latex but their elastic modulus, or stiffness is somewhat higher. They have very high resistance to chemicals, including acids, alkaline solutions and many solvents. PVC, or vinyl, gloves in general have poorer elasticity and tear strength, and are generally used for examination rather then surgical applications[10]."

Lubricants and Alcohol

"A lot of lotions that are water-based or don't have a significant oil component are fine. If oil is the 12th ingredient in the product's ingredient list, it's probably no big deal; but lotions like Vaseline or Keri have high percentages of oil[5]."

"Caution needs to be taken when using alcohol-based sanitizers as they can also affect latex and vinyl. Alcohol-based hand-rubs are considered to be hand sanitizers that contain 60 percent to 95 percent ethanol or isopropanol. While no one disputes the value of alcohol-based products, there is concern among experts regarding proper usage – especially related to glove barrier integrity. Several studies have cautioned that alcohol-based hand sanitizers must be allowed to dry completely, or else they may make gloves susceptible to rapid degradation[5]."
"Studies have shown that some vinyl and polyurethane gloves are susceptible to breakdown when exposed to alcohol that has not been allowed to dry." Truscott is quick to add that there is no lingering degradation effect once the hands are dry[5]."

"Both surgical and examination gloves are permeable to ethanol in alcohol-based disinfectants (Baumann et al 2000)[10]."

"Alternatives for use with gloves include lotions formulated with a water, glycerine, or other non-oil base[7]."

Storage and handling of Gloves

- "Wash, rinse, and dry hands thoroughly after removing gloves or between glove changes.
- Use a pH-balanced soap and avoid cutaneous contact with damaging chemicals.
- Remove gloves at least hourly to air and dry hands.
- Use only non-oil-based hand care products with gloves while at work[2]."

"Gloves should also be evaluated based on the length of time the glove will be worn and any sensitivity the wearer has[4]."

- "Gloves' barrier-protection capacity, as well as performance, can be compromised by everyday practices, such as:
- Glove selection: Choosing the wrong size of glove can interfere with its performance and barrier protection; check for correct fit of glove length, proper contour and thumb position. Also look for embedded debris that may weaken the glove.
- Donning technique: Avoid rips and tears by donning gloves correctly to avoid unnecessary stretching; make sure hands are dry before donning.
- Length of wear: Gloves should be changed frequently to reduce the potential for barrier compromise. Fatigue is exacerbated by rigorous manipulation, and exposure to certain chemicals.
- Storage conditions: Glove material can be degraded by extreme heat, light, moisture and ozone; they should be stored in a cool, dry place located away from light- and electricity-generating equipment such as X-ray machinery[5]."

"Prior to use, medical gloves should not be stored under conditions of excess heat or light, nor be near sources of ionizing radiation, since this will cause more rapid rubber degradation[8]."

Choosing the right glove for the job

The following Table shows a comparison between a variety of gloves[6]:

	Barrier Protection	Strength & Durability	Puncture Resistance	Fit & Comfort	Elasticity	Allergenicity
Latex	Long-standing barrier qualities	Strong, natural rubber is durable	Has Re-seal qualities	Provides comfortable fit	Natural ability due to elastic quality rubber	Contains protein & chemical allergens low powder is preferred
Neoprene (Chloroprene)	Good but tear resistance Is marginal	Strong	Has some puncture resistant qualities	Provides a good fit, has some elastic ability that enhances fit	Close to latex & allows for flexibility	Contains no latex proteins but has some accelerator chemicals
Nitrile	Resistant to punctures & tears, flexes & does not develop holes	Strong has puncture resistant qualities	Has puncture resistant qualities	Slightly tighter fit	Less than latex over time tends to shape to wearer's hand	Contains no proteins but contains some accelerator chemicals
Vinyl	Easily breaks during use, Baggy	Weak, breaks easily & punctures easily in use	Punctures with sharps	Fit limited baggy	Dexterity compromised	Contains no proteins but chemical accelerators
Polyurethane	Durable & high puncture resistance	Excellent tear, puncture & abrasion resistance	Superior to latex for puncture resistance; mimics nitrile in performance	Good comfort & fit; has latex - like qualities	Elasticity is apparent	Contains no latex proteins & no chemical accelerators
Copolymer (block polymers)	Good resistance to tears	Stronger than vinyl; puncture resistance is fair	Easy to puncture	Latex like fit and comfortable	Elasticity superior to vinyl but below latex	Contains no latex proteins but some chemical accelerators

APPENDIX B: TEMPLATE EMAIL SENT TO MASSAGE THERAPISTS

(Veuillez trouver la version française à la suite de la version anglaise)

Dear colleague,

The Atlantic College of Therapeutic Massage (ACTM) in Fredericton New Brunswick is currently undertaking a research project in which your input would be greatly appreciated. Please click on the link below and answer the important questions. This will only take a few moments of your time. We thank you in advance for your time and cooperation

http://actmonline.com/survey.html

This email was sent on Saturday, April 30, 2005. We urge you to respond immediately. Any replies received after Friday, May 6, 2005 cannot be used in this important survey.

To access important information regarding the use of protective barriers (i.e. latex/vinyl gloves, finger cots) and mineral- or vegetable-based lubricants, please click the link directly below. This site will only be active as of Sunday, May 8, 2005.

http://actmonline.com/lotion_and_oil.html

Note: this link will only be accessible from May 8, 2005 on, until July 31, 2005.

Thank you for your cooperation.

ACTM

Cher collègue,

Atlantic College of Therapeutic Massage (ACTM) de Fredericton, Nouveau Brunswick entreprend présentement un projet de recherche et nous vous serions très reconnaissant si vous pouviez prendre quelques instants pour répondre aux questions. Pour répondre, veuillez cliquer le lien ci-dessous.

http://actmonline.com/survey.html

Avis : pour des raisons techniques, le site n'est malheureusement que disponible en anglais. Nous vous prions de nous en excuser mais nous espérons que nous pourrons tout de même compter sur votre participation dans ce questionnaire.

Ce courriel a été envoyé samedi le 30 avril 2005. Il est très important que vous y répondiez immédiatement. Toute réponse reçue après le vendredi 6 mai 2005 ne pourra plus être utilisée.

Le second lien, ci-dessous, ne sera actif qu'à partir de dimanche le 8 mai 2005. Nous vous encourageons fortement à visiter ce site après la date indiquée car il contient de l'information

importante concernant l'utilisation de barrières protectrices (gants et doigtiers en latex/vinyle) avec des lubrifiants à base minérale ou végétale.

http://actmonline.com/lotion_and_oil.html

Avis : ce site ne sera actif qu'entre le 8 mai 2005 et le 31 juillet 2005.

Merci pour votre coopération.

ACTM

Avertissement : Les réponses au questionnaire seront employées uniquement à des fins de recherche et resteront confidentielles. Aucune information pouvant identifier un répondant ne sera employée ou maintenue sans une autorisation écrite du répondant. Les résultats de la recherche n'incluront aucun lien permettant d'identifier les répondants.

APPENDIX C: QUESTION HYPERLINK (HTTP://ACTMONLINE.COM/SURVEY.HTML)

The Atlantic College of Therapeutic Massage is currently undertaking a research project and we would greatly appreciate you taking a few moments to answer the following questions. When your answers are complete, please click "Send".

1 - Do you currently use either vegetable or petroleum based-lubricants (including lotions, creams, oils, etc) when providing massage treatments
to your clients? (Please write the product names or composition in the
line below)

☐ Petroleum based-lubricants

☐ Vegetable based-lubricants

☐ Others (please specify name(s) of product(s) and/or composition):

☐ Don't know (please specify name(s) of the product(s) and/or composition):

☐ I never use lubricants

Please click on link to see the most common mineral and vegetable oils used in massage therapy.

---

2 - Which of the following protective gloves or finger cots do you use when a protective barrier is required during a massage treatment? (Check all that apply)

Gloves:

☐ Vinyl

☐ Latex

☐ Nitrile

☐ Other (please specify):

Finger cots:

☐ Vinyl

☐ Latex

☐ Nitrile

☐ Other (please specify): _____

---

3 - Which of the following protective gloves or finger cots do you use when applying either vegetable or petroleum-based lubricants to a client? (Check all that apply)

Gloves:

☐ Vinyl

☐ Latex

☐ Nitrile

☐ Other (please specify): _____

Finger cots:

☐ Vinyl

☐ Latex

☐ Nitrile

☐ Other (please specify): _____

Additional questions (answers are not required but appreciated)

Sex: ☐ Male ☐ Female

Age: ☐ less than 20

☐ 20 to 29

☐ 30 to 39

☐ 40 to 49

☐ 50 to 59

☐ over 60

Year of graduation from a Massage Therapy School: _____

Province: _____

Submit Query Reset

Thank you for your cooperation.

Disclaimer:

The individual responses to this questionnaire will be used for research purposes only and will remain confidential. No information which may tend to identify a respondent will be used or retained without written authorization from the respondent. Research results will include no linkages to the identity of any respondent.

APPENDIX D: INFORMATION HYPERLINK (HTTP://ACTMONLINE.COM/LOTION_AND_OIL.HTML)

Veuillez trouver la version française à la suite de la version anglaise)

Dear Colleague,

We would like to thank everyone who participated in our research survey on the use of protective barriers (i.e. latex/vinyl gloves, finger cots) and mineral- or vegetable-based lubricants, in the healthcare industry.

The reason for this study was to determine the level of awareness amongst Massage Therapists, regarding the potential risks associated with the use of latex or vinyl gloves/finger cots in combination with mineral- or vegetable-based lubricants.

A number of studies have shown that lubricants (e.g. hand moisturizers, massage oils and lotions) containing such ingredients as mineral oil (and other petroleum-based products), jojoba, aloe vera, palm, coconut or holly oils, lanolin, break down the molecular structure of latex within minutes. This breakdown renders the protective barrier useless and exposes the client and the therapist to potentially dangerous pathogens.

Gloves made of nitrile–an alternative to latex or vinyl–are available at reasonable prices and should be the preferred choice. To the best of our knowledge finger cots are only available in latex, therefore it is our recommendation to use nitrile gloves instead.

Immediately following the French version of this email is a list of healthcare-related websites that address the concerns about interaction of mineral- and vegetable-based products with latex/vinyl.

Cher collègue,

Nous aimerions remercier tous ceux et celles qui ont participé(e)s à notre questionnaire concernant l'utilisation de barrières protectrices en combinaison avec des huiles ou lotions à base de distillat de pétrole ou à base végétale, dans l'industrie de la santé.

La raison pour laquelle nous avons entrepris cette étude était de déterminer jusqu'à quel point les massothérapeutes sont au courrant des risques potentiels attribuables à l'utilisation de gants de latex ou de vinyle avec des huiles ou lotions citées plus haut.

Un certain nombre d'études ont démontré que des lubrifiants tels que des crèmes hydratantes, lotions et huiles de massage contenant des ingrédients comme de l'huile minérale, ou autres huiles à base de distillat de pétrole, ainsi que du jojoba, de l'aloès, de l'huile de palm, de noix de coco ou de houx, de la lanoline peuvent détruire la structure moléculaire du latex en quelques minutes seulement. Cette destruction rend la barrière protectrice inefficace, et expose le client et le thérapeute à des pathogènes dangereux.

Des gants en nitrile présentent une alternative aux gants de latex ou de vinyle et sont disponibles à des prix raisonnables. À notre connaissance, les doigtiers ne sont disponibles qu'en latex. Notre recommandation est donc d'utiliser des gants en nitrile quand le besoin s'en présente.

Voici une liste de sites web de nature médicale, relatifs au problème de l'utilisation d'huiles à base de distillat de pétrole ou d'huiles végétales avec des gants en latex ou en vinyle.

http://www.schoolhealth.com/shop/latexfree.asp

http://www.nursingworld.org/dlwa/osh/wp7.htm

http://www.absa.org/0112cdchand.html

http://www.cdc.gov/oralHealth/infection_control/Faq/hand.htm#affects

http://www.endonurse.com/articles/4c1feat3.html?wts=20050203064142&hc=386&req=latex+and+gloves

http://www.infectioncontroltoday.com/articles/4a1feat1.html?wts=20050203064451&hc=2570&req=latex+and+gloves

http://www.infectioncontroltoday.com/articles/gloves.html?wts=20050203064451&hc=2570&req=latex+and+gloves

http://www.Pro2s.com/links/mainlink.htm#.Pro&Cons

http://europa.eu.int/comm/health/ph_risk/committees/scmp/documents/out48_en.pdf

APPENDIX E: RAW DATA: Table 1a to Table-10 on four pages

NOTE: the raw data can be found in the attached Excel file "Latex"