Please find below the results of your literature search request.

If you would like the full text of any of the abstracts included, or would like a further search completed on this topic, please let us know.

We’d appreciate feedback on your satisfaction with this literature search. Please visit http://www.hello.nhs.uk/literature_search_feedback.asp and complete the form.

Thank you

### Literature search results

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<td>Richard Bridgen</td>
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#### Double-wrapping of surgical instruments – is it necessary?

#### Resources searched

- NHS Evidence; TRIP Database; Cochrane Library; AMED; BNI; CINAHL; EMBASE; HMIC; MEDLINE; PsychINFO; Google Scholar

**Database search terms**: instrument*; SURGICAL INSTRUMENTS; wrap*; “double-wrap*”; double adj2 wrap*.; theatre; theatre; OPERATING ROOMS; operating room*; “operating department*”; clean*; wash*; disinfect*; scrub*; steril*; barrier*; STERILIZATION AND DISINFECTION; INSTRUMENT STERILIZATION; INFECTION CONTROL; asepsis; aseptic; ASEPSIS

**Google search string**: (instrument OR instruments) wrap (clean OR cleaning OR disinfection OR washing OR sterilisation OR sterilization OR asepsis OR aseptic) (theatre OR theater OR theaters OR theatres OR "operating department" OR "operating room")

#### Summary

There is quite a lot of information on surgical wraps and double-wrapping. In terms of published research, you may find studies 4, 10, 11, 14, 15, 16, 18, 19, 20, 21, 23, 26, 36, 37, 41 and 43 particularly useful; otherwise I have includes some results from a search of Google Advanced Search which may also prove illuminating.

#### Guidelines

**Department of Health**

* A guide to the decontamination of reusable surgical instruments 2003

**Royal College of Ophthalmologists**
### Ophthalmic instrument decontamination 2008

#### Evidence-based reviews

None found.

#### Published research

1. **Instrument Cleaning, Wrapping/Packaging, and Sterilization COMPETENCY.**
   - **Citation:** Same-Day Surgery, 02 June 2011, vol./is. /1(4), 01905066
   - **Publication Date:** 02 June 2011
   - **Source:** CINAHL
   - **Full Text:** Available in fulltext at EBSCO Host

2. **Challenging the Sterrad 100NX sterilizer with different carrier materials and wrappings under experimental "clean" and "dirty" conditions**
   - **Author(s):** Diab-Elschahawi M., Blacky A., Bachhofner N., Koller W.
   - **Citation:** American Journal of Infection Control, December 2010, vol./is. 38/10(806-810), 0196-6553 (December 2010)
   - **Publication Date:** December 2010
   - **Abstract:** Background: Sterrad sterilizers have been developed for the sterilization of thermodurable materials. The aim of the present study was to challenge the efficacy of this low-temperature hydrogen peroxide-based sterilization system with different carrier materials and wrappings under experimental "clean" and "dirty" conditions. Methods: We tested the sporoicidal effect of the Sterrad 100NX sterilizer (Advanced Sterilization Products, Irvine, CA) on the carrier materials titanium, polyethylene, and polyurethane with single versus 3 wrappings of inoculated carriers. To simulate insufficient cleaning or crystalline residues, carriers were charged with spore inocula containing organic and inorganic burdens. Results: Our qualitative results show that irrespective of the number of wrappings in the "clean" condition, sterilization by the Sterrad 100NX was equally effective on all 3 carrier materials, reaching a log_{10} reduction rate of >=6 under standard half-cycle conditions. Any additional organic or inorganic challenge significantly impaired the sterilization outcome. Conclusion: Results of our current study emphasize the utmost importance of thorough and reliable cleaning of medical devices before being exposed to a subsequent hydrogen peroxide sterilization process. Any institution using this sterilization technology should have a well-established and validated cleaning process and enforce a rigorous quality assurance program for all steps of the presterilization processing of medical devices. 2010 by the Association for Professionals in Infection Control and Epidemiology, Inc. Published by Elsevier Inc. All rights reserved.
   - **Source:** EMBASE

3. **Elimination of staphylococcus aureus surgical site infections with a common susceptibility pattern**
   - **Author(s):** Strelczyk K.
   - **Citation:** American Journal of Infection Control, June 2010, vol./is. 38/5(E17), 0196-6553 (June 2010)
   - **Publication Date:** June 2010
   - **Abstract:** Issue: Surgical Site infections (SSI) are a significant cause of morbidity and mortality. During the spring of 2009, an increase of SSIs caused by methicillin sensitive strain of S. aureus (resistant only to Pen G) got the attention of the Infection Prevention Team (IPT) at our hospital. An investigation revealed 35 SSIs from January through August, in patients who had surgery in one of our facilities' Operating Rooms (ORs) housed in 3 different buildings. Project: The IPT, along with OR and Sterile Processing Department (SPD) staff conducted a comprehensive investigation of each case, and reviewed the care practices related to surgical patients. The investigation initially revealed a need for improvements in managing peri-operative glucose, as well as standardization to a
chlorhexidine-based skin prep product. No other commonalities were noted with respect to OR staff, surgeons, operating rooms, case types, and day/time of the surgery. The fact that operating rooms in all 3 buildings were affected led the team to focus on observing practices in the new SPD opened in May 2009. Practice improvements already underway in the newly opened SPD were directed towards education and competency verification of staff; repair and documentation of maintenance logs for the sterilizers, ultrasonic units, and automated washers; proper technique for instrument packaging/ wrapping, storage and distribution; and use of appropriate PPE in the instrument decontamination area. In addition, the calibration of the three automated washers was checked during the second week of August 2009, with two requiring adjustments. Results: Our process changes led to several improvements, including a reduction in repairs / maintenance and change in instrument packaging/ wrapping technique (forbidding use of bare arms to wrap items). The last SSI caused by S. aureus with this resistance profile was identified 2 weeks post-op from a surgery done August 12, 2009. We now have over six months with no further SSIs. Lessons Learned: Just because you have a new SPD with new equipment, does not mean all is well! Periodic surveys of disinfection/ sterilization practices are imperative to maintaining quality care. Review of our SSI data for 2009, revealed that rates in all targeted areas would have been well below the national comparison data (NHSN 50th percentile), had it not been for this outbreak!

Source: EMBASE

4. Time versus event-related sterility: linen & pouch packaging remain sterile over a year of storage and handling.

Author(s): Joan LSP, Norhashimawati, Khor S

Citation: Singapore Nursing Journal, 01 January 2010, vol./is. 37/1(34-40), 02180995

Publication Date: 01 January 2010

Abstract: This study examines the effect of time on the sterile integrity of peel pouches single- and double-sealed; double-linen wrap and double-linen wrapped tray. It studied the impact of high-, medium- or low activity levels of the work environment on the storage locations of sterile packages. A total of 600 sterile packages were monitored. They comprised 4 different types of packages consisting of either small dissecting forceps or stainless steel screws and plates to simulate actual items used in the operating room. These were prepared and steam sterilized. After sterilization, 60 samples were sent immediately to the Microbiology Laboratory for analysis of bacterial contamination. The rest were randomly sorted and stored in designated locations in the operating rooms (ORs). At periodic intervals up to 12 months, several packages of each type were retrieved from the locations and analyzed for contamination. The most significant finding was the absence of any increased rate of contamination over time for any packaged type. This shows that regardless of storage location and over a 12 month period, undamaged sterile packages maintained its sterile integrity.

Source: CINAHL

Full Text:
Available in fulltext at EBSCO Host

5. Incidence of instrument compromise in TKA: Comparison of standard instruments vs. single use instruments

Author(s): Young J.

Citation: American Journal of Infection Control, June 2009, vol./is. 37/5(E77), 0196-6553 (June 2009)

Publication Date: June 2009

Abstract: Background/Objectives: Total knee arthroplasty requires numerous instrument trays, which must be cleaned and re-sterilized after the procedure. Infection risk can possible be due to compromised instrumentation from: 1) failure of appropriate sterilization, 2) damage to the sterile wrapping, 3) retained biologic debris, and 4) compromised wraps of instrument cases. A potential mechanism to reduce risk of infection is to reduce the number trays, and possibly the use of single use cutting blocks and trials. The goal of this study was to evaluate the incidence of compromised instruments during total knee arthroplasties and compare this to a single use system. Methods: A multi-center study with an independent data collection (not hospital or surgeon affiliated) was undertaken. Surgeons at six centers performed 321 procedures, 153 with standard instruments (ARM
1), and a second group of 168 cases with disposable cutting blocks and trials along with a reduced set of reusable instruments (ARM 2). An independent evaluator observed and tracked any occurrences related to comprised instruments, trays, or retained biological debris. In ARM 1, five to six re-sterilized trays were used. In ARM 2, two re-sterilized instrument trays were used with single use cutting block and trialing kits. Results: In the standard instrumentation ARM, 28 trays, outer cases, or individual instruments were compromised for an overall incidence of 18.3%. In the Single Use ARM, the overall rate of compromised instruments was 10.1% (a drop of 39%). The largest number of compromised instruments in both groups appeared to be due to damage to the sterile wrapping.

Conclusions: This study demonstrates that traditional total knee arthroplasty has a significant risk of compromised instrumentation. By reducing the number of trays and considering single use instruments, the risk of contamination may be substantially reduced, and therefore decrease the potential risk for infection in total knee arthroplasty.

Source: EMBASE

6. Cooling large instrument sets; evaluating sterilization wraps.
   Author(s): Taurasi R
   Citation: Healthcare Purchasing News, 01 March 2008, vol./is. 32/3(32-32), 10983716
   Publication Date: 01 March 2008
   Source: CINAHL
   Full Text: Available in fulltext at EBSCO Host

7. Clinical issues. Using peel packages inside containers or wrapped instrument trays.
   Author(s): Ogg M
   Citation: AORN Journal, 01 September 2007, vol./is. 86/3(461-462), 00012092
   Publication Date: 01 September 2007
   Source: CINAHL
   Full Text: Available in fulltext at EBSCO Host

8. Sterilization wrap inspections do not adequately evaluate instrument sterility
   Author(s): Waked W.R., Simpson A.K., Miller C.P., Magit D.P., Grauer J.N.
   Citation: Clinical orthopaedics and related research, September 2007, vol./is. 462/(207-211), 0009-921X (Sep 2007)
   Publication Date: September 2007
   Abstract: Orthopaedic procedures rely on strict sterilization techniques to prevent surgical site infections. Surgical instrument trays are wrapped for sterilization, and these wraps routinely are inspected by operating room personnel to evaluate for breaches before using the contained instruments. The sensitivity of this practice for detecting wrap defects has not been established. We divided 90 sterilization wraps into groups with no defect and with six sizes of defects ranging from 1.1 to 10.0 mm in diameter. Puncture-type defects were created using nails of known diameter. All wraps were evaluated by medical personnel for evidence of a breach. Detection rates ranged from 6.7% to 96.7% from the smallest to largest defects, respectively. The potential for bacterial transmission through wrap defects also was evaluated, and contaminated nails of the smallest size transmitted bacterial contaminants through the wrap during the creation of puncture defects. Thus, substantial perforations in sterilization wraps frequently are missed when evaluated with commonly used techniques. Defects with a diameter approximately that of a pencil (6.7 mm) were missed 18% of the time, although contamination can be transmitted by a nail with the diameter of a pin (1.1 mm). These results raise questions about a common screening method.
   Source: EMBASE
   Full Text: Available in fulltext at Ovid

9. Wrapping small instruments in towels; tape on loaner sets.
Author(s): James LA, Girard NJ
Citation: AORN Journal, 01 September 2006, vol./is. 84/3(367-368), 00012092
Publication Date: 01 September 2006
Source: CINAHL
Full Text: Available in fulltext at EBSCO Host

Author(s): Rutala WA, Morelli L, Weber DJ, Thomann CA
Citation: American Journal of Infection Control, 01 May 2006, vol./is. 34/4(248-248), 01966553
Publication Date: 01 May 2006
Source: CINAHL

12. Handling wrapped packages, lost instruments, chemical risks and pregnancy.
Author(s): Taurasi R
Citation: Healthcare Purchasing News, 01 May 2006, vol./is. 30/5(38-39), 10983716
Publication Date: 01 May 2006
Source: CINAHL
Full Text: Available in fulltext at EBSCO Host

13. Test to determine sterile integrity of wrapped medical products at a probability of recontamination of 1:1,000,000
Author(s): Dunkelberg H., Rohmann S.
Citation: Infection Control and Hospital Epidemiology, April 2006, vol./is. 27/4(367-371), 0899-823X (Apr 2006)
Publication Date: April 2006
Abstract: OBJECTIVE. We developed a microbiological test to detect the penetration of airborne microorganisms through the packaging of medical products after sterilization, to meet the requirements of European standard EN 556. We applied this test method to transparent pouches. DESIGN. The microbial-barrier properties of the transparent pouches were determined using the microbial challenge test, in which the package was placed inside an exposure chamber and exposed to a defined aerosol of Saccharomyces cerevisiae. The atmospheric pressure in the chamber was periodically reduced by 0-75 millibars, to simulate weather-dependent pressure changes. Thermoresistant petri dishes filled with nutrient agar were integrated into the transparent pouches before sterilization. The packages were incubated after exposure. They were then opened and examined for colony growth. RESULTS. The number of recontaminated packages per test group (n = 50) depended on the microbial bioload (defined as the number of colony-forming units per plate) to which the packages were exposed and on the size and number of decreases in atmospheric pressure. Results of multiple regression analysis showed a significant increase in the number of recontaminated packages in correlation with the product of the values for microbial bioload and the size and number of decreases in atmospheric pressure. When we analyzed the probability of recontamination of wrapped medical
devices after 2 reductions in atmospheric pressure (30 millibars each) and with a surface microbial load of 10 colony-forming units per 64 cm², we estimated that the frequency of recontamination was 1 : 100,000. CONCLUSION. Multiple regression analysis showed that the proposed microbial challenge test is suitable to determine the probability of package recontamination at the 1 : 1,000,000 level. 2006 by The Society for Healthcare Epidemiology of America. All rights reserved.

Source: EMBASE

Author(s): Allen G
Citation: AORN Journal, 01 January 2006, vol./is. 83/1(224-224), 00012092
Publication Date: 01 January 2006
Source: CINAHL
Full Text: Available in fulltext at EBSCO Host

15. Risk no greater with 1-step sterilization wrap, study finds.
Citation: OR Manager, 01 November 2005, vol./is. 21/11(36-36), 87568047
Publication Date: 01 November 2005
Source: CINAHL

16. Barrier properties and cost implications of a single versus a double wrap for storing sterile instrument packs.
Author(s): Webster J, Radke E, George N, Faoagali J, Harris M
Citation: American Journal of Infection Control, 01 August 2005, vol./is. 33/6(348-352), 01966553
Publication Date: 01 August 2005
Abstract: BACKGROUND: Materials for wrapping sterile items continue to evolve, but evaluation of such products under clinical conditions is rare. The purpose of the current study was to test a new product before introducing it to the hospital's sterilizing processing unit. METHODS: Four hundred packs containing 1199 items were prepared. Half were wrapped in linen and Kimguard sterile wrap (Kimberley-Clark Australia Pty, Ltd; Queensland, Australia), and half were wrapped in Kimguard One-Step sterile wrap (Kimberley-Clark). They were stored on shelves in 4 areas in the hospital. Items from the packs were periodically tested in the laboratory to evaluate shelf life. Time of wrapping was measured on a series of 50 packs (25 using each product), wrapped by 1 experienced person. These were unwrapped by an operating room nurse, and, again, the process was timed. RESULTS: Bacteria were cultured from 20 (1.7%) of the 1157 test items. There were no differences on this measure between the 2 products (P = .64). Coagulase-negative Staphylococcus was the most frequent isolate, accounting for 40% of the positive results. The average time taken to wrap the test tray with the double wrap was 56.4 seconds compared with 32.4 seconds with the single wrap (P < or = .000). Unwrapping the single pack (5.02 seconds) was also faster than unwrapping the double-wrap pack (6.92 seconds; P = .000). CONCLUSIONS: Wrapping sterile items using Kimguard one-step sterile wrap carries no greater risk of bacterial contamination than double-wrap methods and may lead to significant cost savings in both labor (time to wrap) and consumables (linen and recycling costs).
Source: CINAHL

17. Sterilisation wrap - The alternative to metal containers? [German;English]
Sterilisierungsvlies - Die alternative zu metalcontainern?
Author(s): Wegner U.
Citation: Zentralsterilisation - Central Service, November 2004, vol./is. 12/6(397-401), 0942-6086 (Nov 2004)
Publication Date: November 2004
Source: EMBASE
18. Clinical issues. Needle filters; moisture inside wrapped sets; weight of instrument sets; internal indicators; transporting wet sets.

Author(s): Petersen C
Citation: AORN Journal, 01 December 2003, vol./is. 78/6(1002-1005), 00012092
Publication Date: 01 December 2003
Source: CINAHL
Full Text:
Available in print at Pilgrim Hospital Staff Library

19. Long-term Storage of Small Surgical Instruments in Autoclaved Packages

Author(s): Bhumisirikul W., Bhumisirikul P., Pongchairerks P.
Citation: Asian Journal of Surgery, October 2003, vol./is. 26/4(202-204), 1015-9584 (Oct 2003)
Publication Date: October 2003
Abstract: BACKGROUND: In most operating theatres, unused sterile instruments must be re-sterilized according to preset protocols. Protocols differ among institutions and are not based on strong scientific evidence. OBJECTIVE: To determine and compare the duration of sterility of small instruments packaged in double-layered linen versus plastic-paper envelopes after autoclaving. MATERIALS AND METHODS: Two groups of orthopaedic screws were simultaneously sterilized by autoclaving. In Group 1, each screw was packaged in a double-wrapped linen pack. The screws in Group 2 were individually packaged in an inner wrap of paper and an outer plastic-paper envelope that is commercially available. Unwrapped screws in Group 3 served as controls. During the first 48 weeks, five packages were randomly taken from each group, and from 48 weeks to 96 weeks, 20 packages were taken at random and sent for microbial culture. Five screws from Group 3 were also randomly picked with each sample. RESULTS: Up to 96 weeks, no organisms were cultured from any sample from Groups 1 and 2. Almost all samples from Group 3 grew several species of bacteria. CONCLUSION: For small metal instruments, autoclaved packages in double-wrapped linen or double-wrapped plastic-paper combinations can be stored safely for at least 96 weeks.
Source: EMBASE

20. ASHCSP angle. Recommended wrapping techniques to ensure instrument sterility.

Author(s): Blaser EA
Citation: Healthcare Purchasing News, 01 June 2003, vol./is. 27/6(74-74), 10983716
Publication Date: 01 June 2003
Source: CINAHL
Full Text:
Available in fulltext at EBSCO Host

21. A new method for testing the effectiveness of the microbial barrier properties of packaging materials for sterile products [German] Eine neue methode zur wirksamkeitsprüfung von sterigutverpackungen in der praxis

Author(s): Dunkelberg H., Wedekind S.
Citation: Biomedizinische Technik, November 2002, vol./is. 47/11(290-293), 0013-5585 (Nov 2002)
Publication Date: November 2002
Abstract: The aim of our study was to develop a practical test for assessing the effectiveness of the microbial barrier of packaging materials for sterile products. The suitability of the test was verified in the exemplary case of double-wrapped sterilized trays. During testing, the bacterial count of the ambient air was 35 and 440 colony-forming units/cubic metre. The test is based on the co-sterilization in the sterile packing of petri dishes containing CASO agar, which at the end of the test were investigated for re-contamination. The petri dishes covered the sterilizing sieves as completely as possible. After sterilization, the packaging was loaded 300 to 900 times at a pressure of 1 kg (5x/min). This was followed by incubation for 48 hours at 37 degreeC, and evaluation (No.
of colonies). The ability of the agar to culture colonies of bacteria was preserved unchanged for a period of at least 3 weeks after sterilization. For double-wrapped trays it was shown that re-contamination increases with intensity of mechanical loading and the atmospheric bacterial count. Since the package was breached only for the analysis, confounding factors due to removal of contents for examination, were effectively excluded. This test procedure is characterised by simplicity in handling and high specificity. As a final pack test it effectively closes a gap in the quality assurance chain for sterile materials.

Source: EMBASE

22. Effects of handling and storage on sterile dental instruments.

Author(s): Rosa AC, Brusca MI, Manto MC, Mosca CO, Nastri N

Citation: Acta Odontologica Latinoamericana, 2001, vol./is. 14/1-2(35-9), 0326-4815;0326-4815 (2001)

Publication Date: 2001

Abstract: The microbial contamination post-sterilization of dental instruments has been the object of permanent study. The aim of the present study was to evaluate factors affecting long-term sterility of dental instruments sterilized in the dry-oven or autoclave at the Central Sterilizing Service of the School of Dentistry, University of Buenos Aires stored under room temperature and humidity conditions. Half of the 192 samples were placed in standard closed metal containers and sterilized in a dry-oven (D.O), and the remaining half were placed in perforated metal containers and sterilized in an autoclave (A). All the samples were placed in sterilizing paper bags for medical use. Post sterilization, each group (DO and A) was divided into: Group I: minimal handling (control); Group II: wrapping torn mechanically (1 cm); Group III: wrapping torn manually (1 cm). All the samples were stored a closed cabinet. Contamination was evaluated at 30 and 180 days, by seeding under aerobic and anaerobic conditions. Temperature was monitored throughout the experiment, and ranged between 20 degrees C and 31 degrees C (x: 24 degrees C +/- 3.9). Humidity was measured with a digital hygrometer, and ranged between 40% and 60% (x: 54% +/- 10). Group I evidenced no microbial contamination, unlike Groups II and III. Our results evidence that 1) dry oven or autoclave sterilized material that is handled properly during storage remains sterile regardless of variations in temperature and humidity; 2) improper handling affects sterility, and contamination is time-dependent.

Source: MEDLINE

23. Clinical issues. Latex allergy policies and procedures in the OR; peel packages; packaging double-wrapped instruments.

Author(s): O'Neale M

Citation: AORN Journal, 01 October 1996, vol./is. 64/4(608-610), 00012092

Publication Date: 01 October 1996

Source: CINAHL

24. A case of sterilization wrap swap

Author(s): Moses R.F.

Citation: Materials management in health care, January 1994, vol./is. 3/1(38), 1059-4531 (Jan 1994)

Publication Date: January 1994

Source: EMBASE

25. Q & A ... number of patches allowable on reusable linen wrappers and the number of times a reusable cloth wrapper can be reused

Citation: Journal of healthcare materiel management, January 1994, vol./is. 12/1(12), 0889-2482 (Jan 1994)

Publication Date: January 1994

Source: EMBASE

26. Sterility of stained instruments: terminal cleaning of unused OR; technique for double wrapping instruments.

Author(s): O'NEALE M
27. Interim guidance for wraps for surgical instrument trays, pending publication of British standard specifications for disposable tray wraps

Citation: Journal of sterile services management, August 1988, vol./is. 6/2(9), 0951-2578 (Aug 1988)
Publication Date: August 1988
Source: EMBASE

Author(s): Kneedler JA, Gattas M
Citation: Journal of Healthcare Materiel Management, May 1988, vol./is. 6/4(24-8, 30), 0889-2482;0889-2482 (1988 May-Jun)
Publication Date: May 1988
Abstract: The introduction of rigid sterilization container systems in the U.S. marketplace has brought about many questions regarding how they should be used and whether or not they provide a "total system for aseptic practice." Questions have even been raised as to whether the rigid container is a better system than the established cloth and non-woven methods of wrapping. The purpose of this article is to share the results of a study which was conducted to closely examine the use of containers. The focus of the study was to determine whether an inner wrap should be used, whether there were problems at the sterile field with presentation of instruments, and whether the container configuration caused problems in processing, sterilization, storage, or use at the field. No attempt was made to compare various systems.
Source: MEDLINE

Author(s): Gorman NE
Citation: Hospital Materiel Management Quarterly, February 1988, vol./is. 9/3(1-8), 0192-2262;0192-2262 (1988 Feb)
Publication Date: February 1988
Source: MEDLINE

30. Effect of long-term storage on sterile status of devices in surgical packs
Author(s): Klapes N.A., Greene V.W., Langholz A.C., Hunstiger C.
Citation: Infection control : IC, July 1987, vol./is. 8/7(289-293), 0195-9417 (Jul 1987)
Publication Date: July 1987
Abstract: We investigated the effect of the following on the sterile integrity of surgical packs: four wrapping materials (two-ply reusable, nonbarrier wovens, both new and previously used; disposable, barrier nonwovens; and polypropylene peel pouches), dustcovers, two storage locations, and storage times ranging from 2 to 50 weeks. Two hundred sixty-three packs containing stainless steel coupons were prepared, wrapped, sterilized, and stored. Half of the packs were dustcovered prior to storage. At monthly intervals for a year, packs of each type were opened in a laminar flow hood, and the coupons inoculated into trypticase soy broth. The coupon contamination probabilities were 0.019 for reusable, woven packs; 0.017 for disposable, nonwoven packs; and 0.016 for peel pouches. These differences were not significant. The probability of finding a contaminated coupon in any pack after 50 weeks was 0.018. No trend toward increased probability of contamination over time was observed for any of the pack types studied.
Source: EMBASE

31. Sterilization wrapping materials
Author(s): Roots K.A.
Citation: Journal of sterile services management, April 1987, vol./is. 4/6(9, 11), 0951-2578 (Apr 1987)
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<td>32. <strong>A comparison of ethylene oxide penetration rates between a non-woven and a muslin wrapper</strong></td>
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<td>Author(s):</td>
<td>Samuels T.M., Corn R.</td>
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<tr>
<td>Citation:</td>
<td>Hospital topics, March 1982, vol./is. 60/2(38-41), 0018-5868 (1982 Mar-Apr)</td>
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<td>March 1982</td>
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| Publication Date: | March 1982 |
| Source:          | EMBASE    |
| 33. **Aseptic barriers in surgery: their present status.**  |
| Author(s):       | Beck WC   |
| Citation:        | Archives of Surgery, February 1981, vol./is. 116/2(240-4), 0004-0010;0004-0010 (1981 Feb) |
| Publication Date:| February 1981 |
| Abstract:        | Aseptic barriers are employed in the form of surgical gowns, drapes, and wrappers for sterile goods. They possess many of the attributes of textiles, but must also protect sterile zones from microbial invasion. Surgeons rely on them to resist penetration by liquids and other bacterial vehicles. A large variety of both woven and nonwoven materials are being produced for this purpose. The user is faced with difficult choices. The provider of the barrier materials must assure the surgeon of their barrier quality under the usual conditions of their use in operating rooms. Identical standards of quality can be and should be applicable whether these materials are created to be used once and discarded or are reusable. |
| Source:          | MEDLINE   |

| Publication Date: | 1981 |
| Source:          | EMBASE |
| 34. **Measurement on the critical properties of polymeric sterile-wraps using graded biological indicators**  |
| Author(s):       | Jitsukawa S. |
| Citation:        | Medical Journal of Osaka University, 1981, vol./is. 32/1-2(25-29), 0030-6169 (1981) |
| Publication Date:| 1981 |
| Source:          | EMBASE |

| Publication Date: | November 1979 |
| Source:          | EMBASE |
| 35. **The effect of various sterilizing wraps on the corrosion of instruments during autoclaving**  |
| Author(s):       | Walsh M.M. |
| Citation:        | Dental hygiene, November 1979, vol./is. 53/11(504-506), 0091-3979 (Nov 1979) |
| Publication Date:| November 1979 |
| Source:          | EMBASE |

| Publication Date: | September 1971 |
| Source:          | EMBASE |
| 36. **Microbial penetration of muslin- and paper-wrapped sterile packs stored on open shelves and in closed cabinets**  |
| Author(s):       | Standard P.G., Mackel D.C., Mallison G.F. |
| Citation:        | Applied microbiology, September 1971, vol./is. 22/3(432-437), 0003-6919 (Sep 1971) |
| Publication Date:| September 1971 |
| Source:          | EMBASE |
| Full Text:       | Available in fulltext at National Library of Medicine |

**Google Scholar**

*From 1st 50 results…*

37. **Full-Cycle Steam Sterilization in Ophthalmic Surgery—The Effect of Wrapping Instruments**
38. The “six sigma approach” to the operating room environment and infection

Cited by 6

39. Instrument Processing, Work Flow and Sterility Assurance

Cited by 3

40. Sterilization technology for the health care facility

Cited by 1

41. Principles of aseptic technique

Cited by 2

42. Antimicrobial Techniques for Medical Nonwovens: A Case Study

Cited by 7

43. Principles of Aseptic Technique

Cited by 6

44. Rethinking sterilization practices: evidence for event-related outdating

Cited by 6
45. Sterility maintenance assessment of moist/wet material after steam sterilization and 30-day storage
GAA Moriya, KU Graziano - Revista Latino-Americana de ..., 2010 - SciELO Brasil
... these are more vulnerable to contamination: the highest part is closest to the wrap and the ... of moisture (water), considering that the presence of moisture would yield a greater instrument box weight after ... Analysis of the microbial load in instruments used in orthopedic surgeries. ...
Related articles - Cached - All 7 versions

46. A new standard for sterility testing for autoclaved surgical trays
AF Widmer, A Houston, E Bollinger... - Journal of Hospital ..., 1992 - Elsevier
... al.,3 contamination rates ranged from 9-7 to 25-5% depending on the wrap used and ... Another shelf-life study for dental instruments wrapped in paper determined the contamination rate of ... either gauze or stainless steel and failed to include samples of all instrument material as ...
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