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Multiple Uses of Surgical Gloves

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Abstract

Use of surgical gloves for antisepsis is a part and parcel of the routine practice in all medical facilities. However, in the discipline of plastic and reconstructive surgery, the role of surgical gloves has been extended, besides just antisepsis, for many other purposes. The observations made in the Department of Plastic and Reconstructive Surgery, Mayo Hospital, Lahore during the period of June 2007 to May 2008 showed a total of 13 varied uses of surgical gloves. This prompted us to further explore the potential uses of surgical gloves because in developing countries like Pakistan, this routine item can be used as a very useful medical tool in different situations.

Key words: Surgical gloves, Additional uses, Useful medical tool, Surgery

Main Text

The history of first glove used in surgery traces back to Johann Julius Walbaum who described the use of gloves made from the caecum of sheep in the obstetrics in 1758.¹ However, the use of sterile gloves in the operation room was introduced by Sir William Halstead in 1890s and, thus, is considered by many to be the father of the surgical glove.² The initial purpose was to protect the hands of the healthcare professionals against the antiseptics used in the context of the Lister antiseptics theory. Later it proved to be a big step forward into the era of safe surgery by controlling cross infections between the patients and the health care workers including doctors, surgeons and nurses. The first publication, in this regard, has been by Werner von Manteuffel (1897) in which he discussed the use of boiled sterilised rubber gloves in surgery and equated the use of boiled gloves with the boiled hands.³

Now more than 110 years later, the process of evolution of surgical gloves is still going on and the quest for seeking the best manufacturing, hazard free material is seeing no end. Not only the morphology of these gloves is changed a lot, but also the physiology. These routine gloves, after certain modifications, are currently put to a wide variety of uses especially in the practice of plastic and reconstructive surgery.

A study was conducted in the Department of Plastic and Reconstructive Surgery of Mayo Hospital, Lahore during the period of one year. Approximately more than 95% of the gloves were used routinely in the operation rooms and the department wards. In other cases, the gloves were used either as a good substitute for a specific medical item or as a non-conventional medical/surgical tool.

The observed uses of surgical gloves are given below without any specific order:

- Worn by all the surgeons and the theatre staff during the operative procedures to maintain antiseptics. Double gloving was considered mandatory during the procedures on hepatitis B & C and AIDS positive patients.
- Worn by all the concerned ward staff during procedures like handling and dressing of wounds, intravenous and intramuscular injections etc. For each patient, a new pair of gloves was recommended.

- Cut-finger secured by an artery forceps served as an excellent tourniquet in the procedures on digits like Z-plasty, contracture release etc.^{4,5}
- For preventing bed sores, water-filled gloves were put beneath the pressure points in chronic bed-laden patients.⁶
- To facilitate the surgeons in adjusting the light at will, without committing any septic breach, a surgical glove was wrapped on the handle of operation lamp.⁷
- For chest physiotherapy exercise as a balloon-substitute for patients who had to pump air into the balloons to improve pulmonary functions.
- As a sterile container for surgical specimens to be sent to the pathology labs.⁶
- As an instrument pouch for blunt and electrical instruments like cautery, forceps etc.
- Wrapper of the gloves or glove itself was used to form a stencil for graft harvesting and flap planning by cutting into the desired shape by scissors.⁸
- To prevent the wrinkling of slightly long skin grafts when put in kidney tray, these grafts were hung in saline-filled gloves.
- When a flap had to be mobilised through a tunnel like the LD flap for breast reconstruction that had to be pulled through a tunnel to come in front of chest, it was 'gloved' (put in a glove) and then pulled to minimise trauma.
- As a dissecting balloon by putting the glove or a glove finger in specific plane and inflating it e.g. during the elevation of LD flap.⁹
- Worn out and used gloves served as a good tissue simulator for the practicing of surgical and microsurgical knots by the trainee surgeons.¹⁰

Some of the uses mentioned above or similar ones have been described by other authors as well. Besides on further exploration of the literature, we found many other innovative uses of surgical gloves. Below is a compilation of some interesting uses (to be used with references):

- As a substitute of urethral catheter bag.¹¹
- A coloured glove beneath a normal surgical glove can serve good for detecting any glove perforations.¹²
- After liposuction by a syringe, the aspirated tissue can be easily emptied without spillage

- and contamination in a bowl covered by stretched glove.¹³
- Together with towels, a glove can be used as intra-operative hand-holding device.¹⁴
- For continuous skin traction after reduction of finger fracture.¹⁵
- A glove size smaller than the patient's hand can be used as a wrist tourniquet.¹⁶
- As a model for teaching the principles of flap¹⁷ and as a teaching aid for hand anatomy.¹⁸
- For planning the flap in the hands.⁸
- Ointment-filled¹⁹, gauze-filled²⁰ or water-filled²¹ gloves have been used for hand dressing especially in cases of hand burns. The glove-gauze regimen has shown excellent results in the patients with partial and/or full-thickness burns.²⁰
- By using two fingers of a glove, with ice-cold fluid filling the interface, we can maintain hypothermia during digital replantation.²²
- A glove of smaller size than hand can help in reducing oedema of the hand.²³
- As an adjustable tool for size assessment of prosthesis in breast augmentation and re-augmentation.^{13, 24}
- As a model for a missing finger to explain the post operative results in toe-to-hand transfer etc.⁵
- A glove half-filled with ice and water can be used to reduce paraphimosis²⁵, for post-traumatic or postoperative periorbital bruising and as a nasal pack.¹³
- A sponge-in-a-glove can be used to control cardiac bleeding by applying direct pressure.²⁶
- Wearing a glove can make the hand warm and the veins dilate, so can be helpful in cases where venepuncture is difficult.²⁷
- Everted glove-pouch can be used for the hygienic disposal of contaminated guide-wires, catheters and tubes.²⁸
- As a protective, sterile sheathing for the transducer in endorectal ultrasonography.²⁹
- For topical application of vasoactive drugs during experiments, the tip of a glove can be helpful in applying the drug with control of its amount.³⁰
- In mucous membrane reconstruction of eye, a small 'surgical' graft of glove can prevent

- the scarring of the two raw opposing surfaces.³¹
- As a sterile drape over the feet during lower leg and ankle surgery.⁶
- As a mean of transporting amputated distal appendages to a replantation center.⁶
- As a retrieval bag in laparoscopic surgery.³²
- Using a glove and a wound retractor, a method of single-port access laparoscopic-assisted vaginal hysterectomy has been introduced.³³
- The cut-out finger taped on the endoscopic forceps can be a safe and convenient device for the removal of foreign objects.³⁴ The same is true for specimen extraction during laparoscopic radical prostatectomy.³⁵
- A glove finger dressing can be used as a postoperative, compression dressing in the cases of paediatric hypospadias.³⁶
- A saline or water-filled surgical glove can be used to obtain a bulky dressing of axilla after grafting.³⁷
- As a simple device for nail-splinting in cases of injured nails.³⁸
- For securing and transporting small-sized skin grafts like epidermal graft of suction blister.^{39, 40}
- To make a sterile field for nail surgery by gloving the finger and cutting out the glove part over the operative nail.⁴¹
- The sterile glove finger can be used as a surgical drain in dermatology.⁴²
- As a template to trace the skin defects on fingers.⁴³
- As a vacuum assisted closure dressing for multiple finger wounds.⁴⁴

Conclusion

The above discussed uses clearly imply that this list will remain growing with time. Surgical gloves, although introduced as a result of love of William Halstead for his scrub nurse Caroline Hampton (who later became his wife)⁴⁵, have now become one of the most useful inventions in

surgery. The easy availability and cost effectiveness make it an incomparable medical item when seen in the context of so many uses. Especially in developing countries like Pakistan where facilities are limited and the health professionals feel handicapped, utilizing common medical items like surgical gloves can prove to be a very useful practice.

References

1. Fay, M.F. and Dooher, D.T. Surgical gloves: Measuring cost and barrier effectiveness. *AORN J.* 55(6), 1500 – 1519, 1992.
2. Zdravković, D., Bilanović, D., Dikić, S., Zdravković, M. and Milinić, N. William Stewart Halsted -110 years of the use of surgical gloves. *Med Pregl.* 60(7-8), 405 – 408, 2007.
3. Manteuffel, W.Z. Gummihandschuhe in der chirurgischen praxis (Rubber gloves in surgical practice.). *Zentralbl Chir.* 24, 553 – 556, 1897.
4. Harrington, A.C., Cheyney, J.M., Kinsley-Scott, T. and Willard, R.J. A novel digital tourniquet using a sterile glove and hemostat. *Dermatol Surg.* 30(7), 1065 – 1067, 2004.
5. Hou, S.M. and Urbaniak, J.R. Use of the surgical glove in microsurgery. *J Reconstr Microsurg.* 4, 45 – 48, 1987.
6. Krishna, A. and Mohan, D. The other uses of the surgical glove. *Br J Plast Surg.* 50(6), 471, 1997.
7. Lipska, M.A., Brouwer, R.R., Parry, B.R., Bissett, I.P., Wagener, J.O. and Merrie, A.E. Self-adjusting your headlamp: a tip. *Tech Coloproctol.* 10(2), 147, 2006.
8. Imran, D., Mandal, A. and Erdmann, M. Using a sterilised glove as a stencil for planning grafts and flaps. *Br J Plast Surg.* 56(1), 74 – 75, 2003.
9. Ozgok, Y., Kilciler, M., Istanbuluoglu, M., Piskin, M., Bedir, M. and Basal, S. Two-glove-finger-balloon dissection of retroperitoneal space for laparoscopic urology. *J Chinese Med Assoc.* 72(12), 625 – 628, 2009.
10. Manders, E.K., Schenden, M.J. and Furrey, J.A. Soft tissue expansion: concepts and complications. *Plast Reconstr Surg.* 74, 493 – 507, 1984.
11. Jones, A., Briggs, T.P. and Miller, R.A. Exclusive: revolutionary new design in catheter bag technology. *Br J Urol.* 71, 363, 1993.

12. Wigmore, S.J. and Rainey, J.B. Use of coloured undergloves to detect glove puncture. *Br J Surg.* 8, 1480, 1994.
13. Srinivasan, J. and Matthews, R.N. The extended role of the surgical glove. *Br J Plastic Surg.* 50(3), 218 – 219, 1997.
14. Sarifakioğlu, N., Aslan, G. and Cigsar, B. Use of surgical gloves as drapes and hand holders. *Plast Reconstr Surg.* 112(3), 918 – 919, 2003.
15. Hovnanian, A.P. Another use for surgical gloves. *Can J Surg.* 27, 8, 1984.
16. Guirguis, E.M. and Bell, M.S.G. The wrist tourniquet: an alternative technique in hand surgery. *J Hand Surg.* 15, 516 – 519, 1990.
17. Skoff, H.D. A model for training in elevation of local skin flaps in the hand. *J Hand Surg.* 19, 794 – 795, 1994.
18. Mason, L.W. Tips: the use of a disposable rubber glove as a teaching aid for hand anatomy. *J Surg Educ.* 65(2), 136, 2008.
19. Alexander, M.J. Surgical glove treatment for hand burns. *J Am Coll Emerg Phys.* 6, 69, 1977.
20. Coffey, M.J. and Thirkannad, S.M. Glove-gauze regimen for the management of hand burns. *Tech Hand Up Extrem Surg.* 13(1), 4 – 6, 2009.
21. Bayraktar, A., Aydn, U. and Kahveci, R. Hand dressing using a water-filled surgical glove. *Tech Hand Up Extrem Surg.* 10(4), 271 – 272, 2006.
22. Pickford, M.A. A simple technique for maintaining digital hypothermia during replantation surgery. *Plast Reconstr Surg.* 91, 744 – 746, 1993.
23. Perry, J.E. Use of a surgical glove in treatment of edema in the hand. *Physical Therapy.* 54, 498 – 499, 1974.
24. Choudhary, A.S. and Curnier, A. The surgical glove as a breast sizer. *Plast Reconstr Surg.* 111(7), 2482, 2003.
25. Houghton, G.R. The “iced-glove” method of treatment of paraphimosis. *Br J Surg.* 60, 876 – 877, 1975.
26. Vander Salm T.J. Two techniques for the control of cardiac bleeding. *Ann Thorac Surg.* 57, 762 – 764, 1994.

27. Kalmanovitch D.V.A. Dilatation of hand veins. *Anaesthesia*. 46, 517, 1991.
28. Whitmore, M., Rosenberg, T. and Saunders, F.C. Everted glove-pouch technique: a simple method for the hygienic disposal of contaminated guide-wires, catheters and tubes. *Gastroenterology Nursing*. 13, 77 – 79, 1990.
29. Gerard, P.S., Zafaranloo, S. and Frank R. The surgical glove and endorectal sonography (Letter). *AJR*. 156, 865, 1991.
30. Sagi, A., Ferder, M., Goldstein, R. and Strauch, B. A simple device to control the amount of vasoactive drugs topically applied to blood vessels during experimental studies. *Plast Reconstr Surg*. 79, 812 – 813, 1987.
31. Anderson, R.L. The rubber glove graft for mucous membrane reconstruction. *Arch Ophthalmol*. 96, 1465, 1978.
32. Rolton, D.J., Lovegrove, R.E. and Dehn, T. Use of a sterile glove as a retrieval bag in laparoscopic surgery. *Ann R Coll Surg Engl*. 91(5), 440, 2009.
33. Lee, Y.Y., Kim, T.J., Kim, C.J., Kang, H., Choi, C.H., Lee, J.W., et al. Single-port access laparoscopic-assisted vaginal hysterectomy: a novel method with a wound retractor and a glove. *J Minim Invasive Gynecol*. 16(4), 450 – 453, 2009.
34. Yoshida, S., Shimada, M., Ueno, T., Kato, A. and Yoshino, M. Latex hand glove: a safe and convenient device for the endoscopic removal of foreign bodies. *Endoscopy*. 40(2), 195 – 196, 2008.
35. Bani-Hani, A.H. and Gettman, M.T. Specimen extraction with a surgical glove during laparoscopic radical prostatectomy. *Can J Urol*. 12(5), 2843 – 2845, 2005.
36. Singh, R.B., Khatri, H.L. and Sethi, R. Glove-finger dressing in paediatric hypospadias. *Pediatr Surg Int*. 18(2-3), 218 – 219, 2002.
37. Aydin, U., Menderes, V. and Ozgenel, G.Y. Dressing of the axilla using a water-filled surgical glove after axilla grafting. *Aesthetic Plast Surg*. 32(2), 375 – 376, 2008.
38. Lorenzo, A.R. and Villar, F.M. Nail-splinting technique for injured nails: a simple device made of a surgical glove. *Ann Plast Surg*. 59(4), 477, 2007.
39. Eroğlu, L., Akbaş, H., Güneren, E., Demir, A. and Uysal, A. Securing skin grafts using a surgical glove. *Plast Reconstr Surg*. 108(5), 1459 – 1460, 2001.

40. Laxmisha, C. and Thappa, D.M. Surgical Pearl: gloved finger as a transport platform for epidermal graft of suction blister. J Am Acad Dermatol. 57(5), 18 – 19, 2007.
41. McGinness, J.L. and Parlette, H.L. Versatile sterile field for nail surgery using a sterile glove. Dermatol Online J. 11(3), 10, 2005.
42. Peterson, S.R., Chilukuri, S., Goldberg, L. and Joseph, A.K. Surgical pearl: use of sterile glove finger as a surgical drain. J Am Acad Dermatol. 49(5), 902 – 903, 2003.
43. Nagasao, T., Shimada, T. and Nakajima, T. Utilizing a surgical glove to trace skin defects on fingers. Plast Reconstr Surg. 111(5), 1765 – 1766, 2003.
44. Foo, A., Shenthilkumar, N. and Kin-Sze Chong, A. The 'hand-in-gloves' technique: vacuum-assisted closure dressing for multiple finger wounds. J Plast Reconstr Aesthet Surg. 62, 129 – 130, 2009.
45. Spirling, L.I. and Daniels, I.R. William Stewart Halsted--surgeon extraordinaire: a story of 'drugs, gloves and romance'. J R Soc Promot Health. 122(2), 122 – 124, 2002.

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