

Review Article

Fifty shades of surgical gloves: fifty uses in surgery

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ABSTRACT

The primary use of surgical gloves in theatre is to maintain antiseptic sterile interface between the surgeon and the patient. Since their pioneer use in the late 19th century, their innovative uses have continued to evolve with time. This is mainly true in less fortunate countries where resources are limited and under constant financial constraints. However, such uses are still beneficial even in first world countries, when such readily available gloves can serve the propose of other more expensive material, or more importantly, when such materials are not readily available. This paper explores and summarizes these common 50 uses in different categories of surgical specialities.

Keywords: Surgical gloves, Innovative ideas

INTRODUCTION

Surgical gloves primary use is maintain antiseptic interface during surgical procedures, protecting both the patient and the surgeon. Their pioneered use go back to 1896, when William S. Halsted from John Hopkins Hospital used them as a protective tool for the surgeon's hands against the harmful effect of antiseptic solutions.¹ Their use continue to evolve into a safety barrier against cross-contamination between surgeon and patient over the years, following Werner von Manteuffel's first publication comparing the use of boiled sterilised rubber gloves to operating with boiled hands in 1897.² Since then, there have been a lot of innovative ideas on the use of these gloves in surgery. These uses are particularly important for surgeon in developing countries where such ideas can represent a substantial financial relief on the budget, or even in developed countries, as quick last minute resort when other equipment's are not readily available. This paper explores and summarises these common 50 uses in different categories of surgical specialities.

General uses

Protection: Worn by all the concerned ward staff during procedures like handling and dressing of wounds, intravenous and intramuscular injections etc.³

Pressure ulcers: For preventing pressure ulcers in chronic bed-laden patients, where water-filled gloves were put beneath the pressure points.⁴

Chest physiotherapy: For chest physiotherapy exercise to improve pulmonary function as a balloon-substitute for patients who had to pump air into the balloons.³

Cannulation: Facilitating venous cannulation by wearing a glove induces venous dilatation and can be helpful in difficult venepuncture.⁵

Generic surgical uses

Sterility: Worn by all the surgeons and the theatre staff during the operative procedures to maintain antisepsis,

also double gloving is considered mandatory during the procedures on hepatitis B & C and HIV positive patients.³

Light handle: A surgical glove wrapped on the handle of operation lamp allow the surgeons to adjust the light and yet stay sterile.⁶

Container: As a sterile container for surgical specimens to be sent to the pathology labs (4).

Sterile pouch: As an instrument pouch for blunt and electrical instruments like cautery, forceps etc.²

Fluid bag: As a substitute of urethral catheter bag.⁷

Gloves punctures: A coloured glove beneath a normal surgical glove can detect glove punctures.⁸

Disposal bag: Everted glove-pouch can be used for disposal of contaminated tubes, catheters and guide-wires.⁹

Training simulator: A good tissue simulator for the practicing of surgical and microsurgical knots by medical students and junior trainee.⁴³

General surgery

Instrumental sheath: As a protective, sterile sheathing in endorectal ultrasonography transducers.¹¹

Transport bag: As a mean of transporting amputated distal appendages to a replantation centre.⁴

Retrieval bag: As a retrieval bag in laparoscopic surgery.¹²

Foreign objects retrievals: The cut-out finger taped on the endoscopic forceps can be a safe and convenient device for the removal of foreign objects.¹³

Reconstructive surgery

Digital tourniquet: Cut-finger secured by an artery forceps served as an excellent digital tourniquet in the procedures on digits like Z-plasty, contracture release, fingertip injuries etc.^{14,15}

Graft and flap template: Gloves wrapper or the glove itself can be used to form a template for flap planning and graft harvesting by cutting it into the desired dimensions.¹⁶

Graft stretcher: Long skin grafts can be hung in saline-filled gloves to prevent the wrinkling if put in a kidney tray.³

Flap coat: 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 be delivered into the

anterior chest, it was 'gloved' (put in a glove) and then pulled through to minimise trauma.³

Flap harvest: 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.¹⁷

Fat transfer: After liposuction, the aspirated fat can be easily emptied without spillage and contamination in a bowl covered by stretched glove.¹⁸

Graft splint dressings: A saline or water-filled surgical glove can be used as a bulky dressing for axillary skin grafting.¹⁹

Graft transporter: For securing and transporting small-sized skin grafts like epidermal graft of suction blister.^{20,21}

Hand surgery

Hand holder: A glove can be used as intra-operative hand-holding device along with draping towels.²²

Fracture traction: For continuous finger traction after reduction of phalangeal fracture.²³

Wrist tourniquet: A glove size smaller than the patient's hand can be used as a wrist tourniquet.²⁴

Simulation flap design: As a simulator for teaching hand anatomy.²⁵

Operative flap design: For planning flaps in the hand surgery.¹⁶

Hand dressing: Ointment-filled or gauze-filled gloves can be used for hand dressing, and glove-gauze regimen has shown excellent results in the patients with partial and full-thickness hand burns.^{26,27}

Replant hypothermia: Maintaining digital hypothermia during replantation can be achieved by using two fingers of a glove with ice-cold fluid filling the interface.²⁸

Hand oedema: A smaller size glove can help in reducing hand oedema.²⁹

Toe-to-hand transfer: As a model for a missing finger to explain the post-operative results in toe-to-hand transfer.¹⁵

Eponychial fold splint: As a device for nail-splinting in injured nails to prevent eponychial collapse.³⁰

Digital sterility: To make a sterile field for nail surgery by gloving the finger and cutting out the glove tip over the operative nail.³¹

Finger template: As a mapping template for digital skin defect.³²

Hand VAC: As a vacuum assisted closure dressing for multiple finger wounds.³³

Scalp and cranial surgery

Hair bubble: As a hair bubble in hair separation during scalp and cranial surgery.³⁴

Breast surgery

Breast size: As an adjustable tool for size assessment of prosthesis in breast augmentation.³⁵

Ear, nose and throat surgery

Nasal pack: A glove half-filled with ice and water can be used as a nasal pack.¹⁸

Orbital and periorbital surgery

Ice back: A glove half-filled with ice and water can be used for post-traumatic or post-operative periorbital bruising.¹⁸

Soft tissue interface: A small 'surgical' graft of glove can prevent the scarring of the two raw opposing surfaces in mucous membrane reconstruction of the eye.³⁶

Trauma and orthopaedics surgery

Foot draping: As a sterile drape over the feet during lower leg and ankle surgery.⁴

Isolation interface: To prevent tourniquet-associated cleansing solutions chemical burns when tourniquet used in limb surgery.³⁷

Urology

Paraphimosis reduction: A glove half-filled with ice and water can be used to reduce paraphimosis.³⁸

Specimen extraction: During laparoscopic radical prostatectomy, the cut-out finger taped on the endoscopic forceps can be used as a device for specimen extraction.³⁹

Hypospadias: A glove finger dressing can be used as a postoperative compression dressing in paediatric hypospadias repair.⁴⁰

Cardiothoracic surgery

Haemostasis: A sponge-in-a-glove can be used to control cardiac bleeding by applying direct pressure.⁴¹

Obstetrics and gynaecology

Retractor: As a method of single-port access laparoscopic-assisted vaginal hysterectomy by using a glove and a wound retractor.⁴²

Dermatology

Cutaneous drain: The sterile glove finger can be used as a surgical drain in dermatology.⁴³

CONCLUSION

It has been over a century now since the introduction of surgical gloves. There have been innovative ideas on their use in theatre, apart from their undisputed role as a primary barrier for cross-contamination between the surgeon and the patient. These uses are particularly important for surgeon in developing countries where such ideas can represent a substantial financial relief on the budget, or even in developed countries, as quick last minute resort for a specific use when other equipment are not readily available and would help to serve the purpose.

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