

Innovative Application of Ziplock Tags for External Tissue Expansion

Padmalakshmi Bharathi Mohan, Saurabh Gupta, Ravi Kumar Chittoria, Abhinav Aggarwal, Chirra Likhitha Reddy, Imran Pathan, Shijina K

Department of Plastic Surgery and Telemedicine Division, Jawaharlal Institute of Postgraduate Medical Education and Research (JIPMER), Puducherry, India

Abstract

Tissue expansion is a technique, which uses the biomechanical properties of skin and thereby aiding in wound closure. Commercially available devices for external expansion are not cost-effective. Hence, in this article, we would like to share our experience of innovative use of ziplock as external tissue expansion.

Keywords: Innovation, tissue expansion, ziplock tags

INTRODUCTION

Skin possesses unique properties, which allow it to conform to the shape depending on the external or internal forces applied. Using few of its properties such as creep and elasticity aids in an important aspect of plastic surgery, which is wound coverage. Two types of skin expansion have been described: internal and external tissue expansion. Various external tissue expansion devices are available. In this article, we would like to share our experience of innovative use of ziplock as external tissue expansion.

MATERIALS AND METHODS

This study was conducted in a tertiary care hospital in June 2019.

The patient was a 65-year-old gentleman, a known case of diabetic and hypertensive, chronic liver disease, and portal hypertension with thrombocytopenia. He had a chronic nonhealing ulcer over the dorsum of the right foot for 1-month duration.

Even after wound bed preparation with medical and surgical methods, the wound bed could not be covered, due to his thrombocytopenia, which made him unfit for major surgery.

Hence while optimizing the patient general condition, we thought of innovative method of using commercially

available ziplock tags for using as external skin expansion device.

Materials required

1. Commercially available 15 cm ziplock tags, 2. polypropylene suture material, 3. instruments for suturing. The cost of each ziplock tag was INR 5 [Figure 1].

Steps

The lock end of the ziplock was cut and it was sutured to the normal skin around the ulcer on one side [Figure 2]. The zip tag end was sutured to the opposite side of the lock end and it was locked [Figures 3 and 4]. As we were waiting for the patient general condition to improve, the ziplock was tightened and advanced on a daily basis by few millimeters. This way, the size of the wound, which was 15 cm × 7 cm on admission, had reduced to 10 cm × 5 cm [Figure 5]. It was applied to prevent expansion of wound margins as well as to bring them together. It was used as adjuvant therapy in multimodality wound bed preparation. Once the patient improves, the wound will be covered.

Address for correspondence: Dr. Ravi Kumar Chittoria, Department of Plastic Surgery and Telemedicine Division, Jawaharlal Institute of Postgraduate Medical Education and Research (JIPMER), Jipmer Campus Rd, Gorimedu, Puducherry 605006, India. E-mail: drchittoria@yahoo.com

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Figure 1: Equipments required

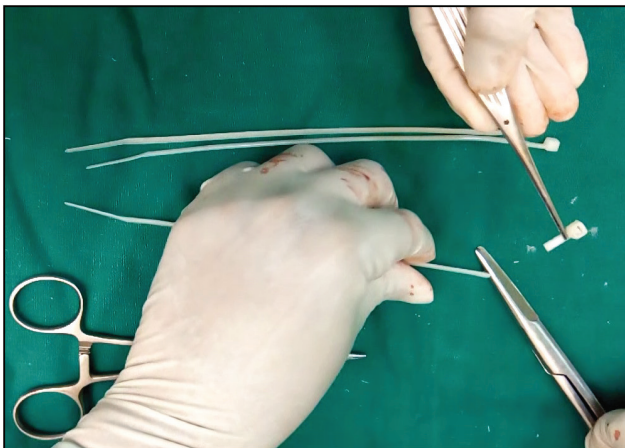


Figure 2: Lock end of the zip ties being cut

DISCUSSION

Immediate, primary closure of wounds is the best solution for soft tissue defect closure because of its simplicity and satisfactory outcome, yet it might not be possible always.^[1] Various factors, both wound related (due to a big raw area) and patient related (general condition being unfit for surgery) will not permit early closure, either primarily or by grafts and flaps. In that case external tissue expansion plays a major role.

Skin is a dynamic tissue, which has unique biochemical properties that allow it to protect and conform to the body that it covers. They are (a) stress, (b) strain, (c) creep, (d) elasticity, (e) extensibility, (f) viscosity, (g) anisotropy, and (h) viscoelasticity.^[2]

Tissue expansion was described first by Neumann,^[3] who related the use of a rubber balloon placed subcutaneously in the postauricular region. This was a form of internal tissue expansion. Since then various research has been



Figure 3: Ends being sutured to the wound edges

undertaken and tissue expansion has gained widespread popularity

In recent days, the same techniques that have used the creep and stress relaxation phenomena of skin used in internal expansion has been extrapolated to gain tissue for wound coverage in the form of external tissue expansion. Various commercial devices are available for external wound expansion. But they neither are they easily available, nor are they cost-effective (INR 5000 for a single application). To circumvent those issues, ETEWC technique using hooks and rubber bands which can be used for wound closure have been described.^[4]

In a similar manner, we have described the use of ziplock eternal tissue expansion, which is cost-effective (INR 5/ piece). It is also easily available, and can be sterilized easily using ETO or gamma radiation.

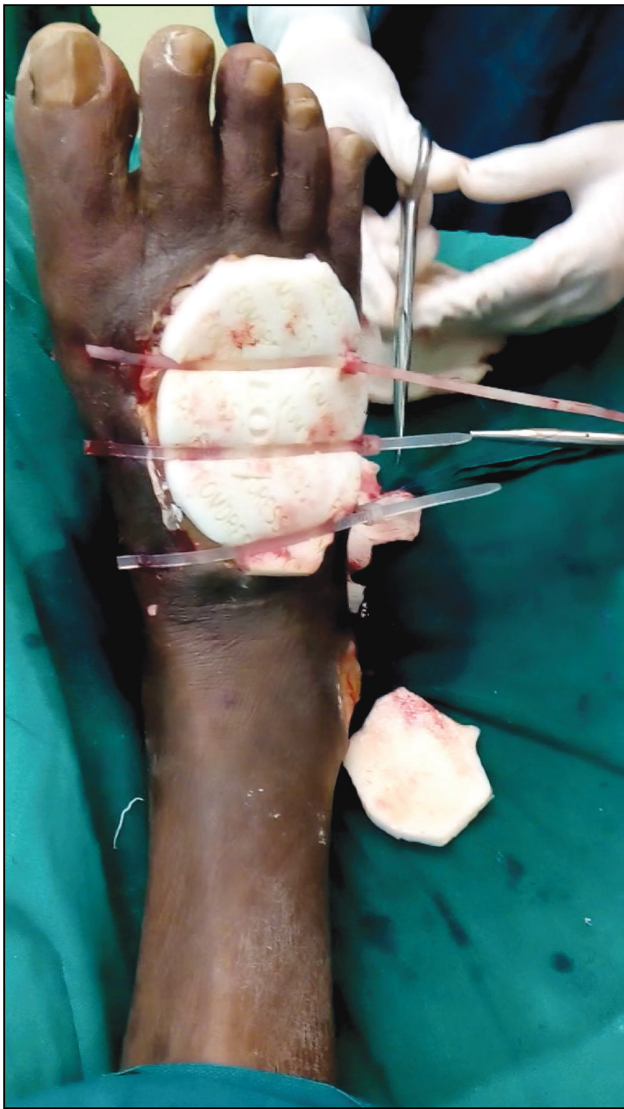


Figure 4: Post application of ziplock tags

The advantages of this method is that, while waiting for the general condition of the patient to get optimized, we can reduce the wound size and thereby decrease the size of graft or flap used. It is based on the principle that, the given pressure exerted through a smaller area will be much higher than the same pressure exerted through a larger area. Hence it is much better than sutures used to approximate the edges of a wide wound. The prerequisite is that the wound margins are healthy enough to sustain the tension. It can also be used as an effective dressing holder, which prevents the dressing from getting dislodged.

The disadvantages are that it cannot be used in an inflamed skin margin because it will shear the skin.



Figure 5: Decrease in wound size post application of ziplock tags

CONCLUSION

External skin expansion using ziplock tags is easy to apply, cost-effective, can be applied bed side and results are comparable with commercially available external expansion devices. A controlled, large sample size study with statistical analysis is required to substantiate the results.

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form the patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

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Conflicts of interest

There are no conflicts of interest.

REFERENCES

1. Topaz M. Invited commentary: External tissue expansion and tension relief systems for improved utilisation of the viscoelastic properties of the skin in wound closure. *Indian J Plast Surg* 2014;47:467-8.
2. Alt JA, Collins WO. An objective comparison of leakage between commonly used earplugs. *Am J Otolaryngol* 2012;33:469-72.
3. Neumann CG. The expansion of an area of skin by progressive distention of a subcutaneous balloon. *Plast Reconstr Surg* 1957;19:124.
4. Chittoria R, Mohapatra D, Thiruvoth F, Sivakumar D, Ashokan A, Nandhagopal V. External tissue expansion for difficult wounds using a simple cost effective technique. *J Cutan Aesthet Surg* 2015;8:50.