

# Pre-operative Use of a Novel Adhesive Skin Expanding Device for Primary Closure of Complicated Wide Local Excisions. R Berg, H Hristov, R George. Queen's University, Department of Surgery, Division of Surgical Oncology

## ABSTRACT:

Two years ago we reported the use of pre-operatively applied adhesive skin anchors to expand the skin surrounding areas of planned wide excision for malignancy. These anchors had been designed to facilitate secondary closure of open wounds. As a result of that experience, we now report on our first cases using a new device designed to better address the pre-operative setting. The new design incorporates a non-adhesive elastomer into the mid portion of an otherwise adhesive dressing. Application provides continuous traction in the axis of placement. Pre and post operative photography document each lesion, planned excision, and end results. (Key cases are shown in poster). Patients are followed for flap viability, success of primary closure, infection rate, as well as subjective assessment of cosmetic outcome. Thirteen cases have been completed and represent areas associated with poor skin mobility and/or hypertrophic scarring. Three required resection in previously radiated fields. All cases were closed primarily without grafting. One patient experienced flap necrosis managed conservatively with dressing care and eventual granulation, and 1 patient had a portion of her wound opened for cellulitis/abscess. Dynamic pre-operative expansion facilitates primary skin closure of wide excisions in difficult anatomic locations. The new device has proven safe and effective in our initial series.

## The Problem:

Wide excisions are required in the management of malignancies involving the skin.



Wound closure with flaps or skin grafts requires high level of expertise



Closure under tension  
-poor cosmesis  
-high complication rates



## A Solution: Dynamic Skin Expansion

### Biomechanical Creep

- Application of a constant load to an area of skin
- Increase in skin length over time
- Gradual decrease in the force required to keep it at length

### Collagen fibers:

- Relaxed state: randomly oriented
- Load application: longitudinal patterning in direction of stretching force until parallel and resist further expansion
- Finite limit to mechanical creep (Melis, P. et. al. (2002) Rapid alignment of collagen fibers in the dermis of undermined and not undermined skin stretched with a skin stretching device. Plast. Reconstr Surg. Feb:674-80)

## Past experience: Adhesive Anchor

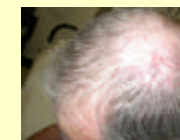
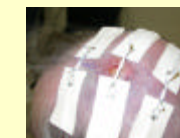
Designed for secondary intention closure.  
- Successfully applied to 7 cases of pre-operative expansion.

- Presented CSF 2005.

- Design of elastomer tube bulky in outpatient setting, and uncomfortable under clothes.

**New Design:** specifically intended for pre-op outpatient application.

- Dynastretch ® incorporates non adherent elastomer between cloth adhesives.



Myxoid Liposarcoma shin, 79 year old female.

Pre-op radiation complicates closure.

Resection with negative margins. 5 day pre op application and 2 week post op.

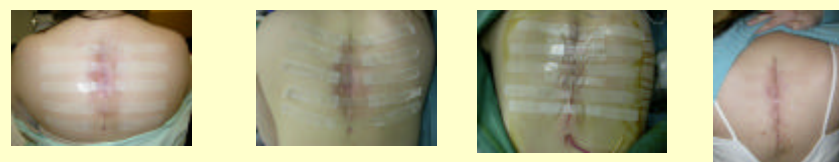
Minimal midline flap necrosis, now completely healed..



Leiomyosarcoma back, 25 year old female.

Complicated by neo-adjuvant radiation and prior resection with positive margin

Pre op application for 5 days. Wide excision in radiated field. Primary Closure. Margins widely clear.



Incomplete prior excision and horizontal orientation of initial incision led to requirement of this

Extensive vertical re-excision. Closed primarily with 5 days pre op dynamic expansion.



Wide excision of scapular melanoma.

Area prone to hypertrophic scarring, heals beautifully with 2 days of pre-op expansion.



- Our current experience includes 7 cases with the original adhesive anchor, and 13 new cases with the Dynastretch model.
- No adverse effects of preoperative application
- All have tolerated the pre-op application without discomfort
- All wounds have been closed primarily with good cosmetic results.
- One wound infection requiring packing and antibiotic coverage has now healed fully with no second procedure.
- One case of flap necrosis after neo-adjuvant radiotherapy has granulated in with dressing care and no second procedure.

Special thanks to Canica for provision of Dynamic skin expanders.