Management of scar tissue during the maturation process through dynamic prolonged stretch using Lycra garments with reinforcement panels

Debra Wright, Research and Development Manager, Jobskin Ltd, Nottingham UK. **Lydia Dean,** Lead Therapy Specialist, Jobskin Ltd, Nottingham UK

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Introduction

Therapists are always searching for methods of intervention in the management of scar tissue during the maturation process that will leave the patient with a flat, mobile scar that is the optimal length to maintain and enhance function.

Rehabilitation of the burn injured patient

'To achieve the optimum aesthetic and functional outcome in order to improve a patients quality of life'

The aims of scar management and rehabilitation is to assist the individual to achieve optimal function, optimal cosmetic outcome and maximise independence. Prevention of scarring is the main aim of burn care rehabilitation and begins from day one and continues up to and after scar maturation and optimal outcomes are achieved.

The treatment regime requires patient commitment and a multi-disciplinary specialist team to facilitate patient care which may involve the family /carers and continue for many years. The journey will encompass psychological, social and physical aspects of care and may encounter many challenges along the way, where the best model of care is essential to reach optimal outcomes in rehabilitation and quality of life.

The goals of rehabilitation are to reduce pain, promote wound healing, prevent complications, maintain range of movement, minimise contracture development, prevent and reduce problem scarring and minimise the long term psychological effects.

Teamwork

Scar management

To achieve optimum aesthetic appearance and functional outcome

Short term

To control and treat Hypertrophic or Keloid scaring

Long term

Improved cosmetic outcome
Restore function
Relieve symptoms
Prevent recurrence

The role of compression therapy in burns and scar management

The use of external pressure applied by means of pressure garments is well documented and widely accepted as a primary treatment modality in scar management.

Applying pressure to a burn is thought to reduce scarring by hastening scar maturation. External pressure prevents collagen synthesis resulting in re-orientation of the collagen fibres into a uniform and parallel pattern as opposed to the whorled pattern seen in untreated scars. There is some evidence around its mechanism of action but it is thought to create localised hypoxia to the scar tissue reducing blood flow and the formation of collagen, decreasing scar formation.

Pressure garments help to achieve a flatter, softer more pliable scar which results in an improved cosmetic appearance, a reduction of potential contractures and optimal aesthetic and functional outcome for the individual.

Pressure garments should provide the necessary characteristics to be both clinically effective and comfortable to wear. Pressure garments are tight fitting and made from elastic fabric containing lycra, designed to exert pressure over the scar area whilst allowing full functional movement and are applied as soon as the wounds are healed and able to tolerate pressure and are worn for 23 hours a day, removing only for washing and creaming of scars.

Medical pressure garments are manufactured using a multi-directional stretch fabric provided by a modulus (tensile strength at a given point). This is controlled by the hexagon shape construction which provides continuous compression contouring the body without restricting movement. Compression garments are made using a modulus according to the diagnosis or prescription. The recommended pressure delivery for burns and scar management is 23-32mmHg, documented as the optimal pressure delivery in scar management.

Experience

For further information on Jobskin® MTM Pressure Garments and Reinforcement Panels please contact:
Debra Wright, Jobskin Ltd, dw@jobskin.co.uk or
Unit 13a Harrington Mill, Leopold Street, Long Eaton, Nottingham NG10 4QG

t: +44 (0) 115 973 4300 | **e:** orders@jobskin.co.uk **www.jobskin.co.uk**

The role of splinting in burns and scar management

The shortening of scar tissue as it matures results in the development of deformities. It is important that prolonged stretch is provided in a timely manner to ensure maturation of the scar tissue is at an appropriate length to maintain function. Joint range and mobility is therefore the primary concern of the therapist during rehabilitation.
The treatment goals for splinting include:

- Increase and maintain soft tissue length
- Increase and maintain range of movement
- Prevention of deformities
- Management of hypertrophic scarring
- Enhance function

When considering splinting the therapist will consider application of splints during two phases post burn.

Acute: When wounds are open to assist with positioning of the body part to also to assist with oedema (specifically in the extremities).

Maturation phase: When wounds are healed to resist the contracting forces of the scar tissue and to model the scar tissue to enable best joint alignment, soft tissue length and the required forces for movement.

The role of stretching and exercise in burns and scar

In the acute phase static splinting is used to maintain position and soft tissue length as well as manage oedema. The level and quality of extra collagen produced during the healing process will be less elastic and the fibres disorganised leading to adhesions and tethering. When a joint surface is affected the soft tissue length must be maintained through stretches and exercises or this will lead to loss of ROM and joint alignment resulting in contractures that will affect function and appearance. Stretching and exercise regime is an essential part of scar management and requires compliance and skilled therapy support.

Case Study

Case history:

- In May 2009 Connor Rowntree aged fifteen years, sustained 90% flame burns.
- Admitted to The Royal Victoria Infirmary Burns unit.
- Discharged from hospital in April 2010.
- Numerous skin graft operations and re-admissions for scar reconstruction.
- Connor now aged eighteen has returned to college and drives and is leading a full life.

Therapy issues:

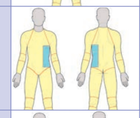
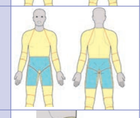
- Extensive burns to almost entire body surface area.
- Poor posture due to prolonged critical care stay.
- Posture of a growing teenage boy with extensive scarring.
- Ability to have a sustained stretch over prolong period whilst maintaining function.
- Orthosis needed compatibility with thermostatic splintage where applicable.
- Compliance to scar regime Rx due to percentage of burn.

Clinical reasoning for pressure therapy with the addition of reinforcement panels:

- Patient had good compliance to wearing pressure garments
- Patient was able to don/doff pressure garment with added panels independently.
- Empowerment in choice of colours and some design by patient was facilitated.
- Pressure garment was aesthetically acceptable and comfortable.
- Addition of reinforcement panels sustained corrective body alignment and dynamic prolonged stretch on the scar.
- Addition of panels provided dynamic prolonged stretch to the anterior trunk.
- Proprioceptive feedback through dynamic compression enhancing postural control and function.

Range of reinforcement panels available

*For the full range, please visit our website**

Code	Diagram	Name and Description	Garment Type
CP2		**Posterior Cross Panels** To provide stretch and alignment into retraction of the scapulae and back extension for scarring of the anterior chest	All in one Suit Leotard Vest
CP1		**Anterior Chest Panels** To provide stretch and alignment into protraction of the scapulae for scarring to the upper back	All in one Suit Leotard Vest
BP		**Posterior Back Panels** To provide stretch and alignment of the trunk into extension for scarring on the anterior surface of the trunk	All in one Suit Leotard Vest
TP		**Lateral Trunk Panels Left or Right** To provide stretch and realignment of the trunk into mid line for scarring to the lateral trunk areas.	Leotard Vest
APP and PPP		**Anterior and Posterior Pelvic Panels** To provide prolonged stretch to scarring either on the anterior or posterior surface of the pelvis and upper thighs; as well as provide alignment of the pelvis.	All in one Suit Pants Shorts
UL1		**Dorsal Wrist Panel** To provide stretch and alignment of the wrist into extension for scarring on the volar surface of the hand, wrist and forearm	Sleeve Gauntlet Long sleeve Glove

Innovation

The role of dynamic reinforcement panels in pressure garments – a new and evolving concept

As mentioned before pressure garments help to achieve a flatter, softer more pliable scar which results in an improved cosmetic appearance, a reduction of potential contractures and optimal aesthetic and functional outcome for the individual. The challenge has always been addressing issues relating to postural control, alignment and proprioceptive feedback.

The therapy specialists at Jobskin have been working with therapists to address the provision of a pressure garment that will also assist in providing dynamic prolonged stretch to scar tissue. The requirements identified clinically needed to address postural alignment, prolonged stretch and provide the necessary pressure to flatten the scar; as well as providing sensory and proprioceptive feedback necessary for active ROM.

The next step was to design a method of incorporating the identified requirements into the manufactured burns garment that currently provided scar management using pressure. Reinforcement panels were designed to provide prolonged stretch and directional pull for musculo-skeletal realignment and stabilisation. These panels would provide constant and consistent pressure and resistance whilst maintaining the dynamic component of the garment.

By providing musculo-skeletal alignment and stabilisation through the reinforcement panels it was possible to improve:

- Postural control and stability
- Range of movement
- Quality of movement
- Functional potential

The success of the addition of reinforcement panels will depend on:

- Well healed scar
- A scar with sufficient tensile strength to endure the prolonged corrective stretch and resistance
- Compliance with initial garment

Conclusion

The goal of intervention will always be:

'To achieve the optimum aesthetic and functional outcome in order to improve a patient's quality of life'

It is important for the clinician to assess and identify the musculo-skeletal correction and assistance required prior to making the decision to add reinforcement panels to a burns pressure garment. The design choice should provide the required consistent and constant prolonged stretch as well as the resistance and realignment without restricting movement.

The use of reinforcement panels as an adjunct to pressure therapy provides the clinician with a choice of dynamic as opposed to rigid management of deformities caused through scar contracture development.

To improve outcomes within this area of expertise, clinicians need to be proactive. They need to be actively involved in identifying new interventions in scar management to enhance functional potential compliance and minimise the psychological impact of scarring.

Further evaluation of the benefits of the application of reinforcement panels incorporated into burns pressure garments will provide the clinician with a new and innovative adjunct in the rehabilitation process and challenges faced in scar management.

Outcome

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