


<b>USE OF TISSUE ADHESIVE FOR MINOR LACERATION REPAIR IN THE EMERGENCY DEPARTMENT</b>	
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Our Lady's Children's Hospital, Crumlin		
Document Name: Use of Tissue Adhesive for Minor Laceration Repair in the Emergency Department		
Reference Number: UTAMLRED-11-2016-AMCD-V1	Version Number: V1	
Date of Issue: November 2016	Page 2 of 8	

## CONTENTS

### Page Number

<b>1.0</b>	Introduction	3
<b>2.0</b>	Definition of Guideline	3
<b>3.0</b>	Indications for use	3
<b>4.0</b>	Guidelines for equipment	4
<b>5.0</b>	Procedure for the application of tissue adhesive	5-6
<b>6.0</b>	References	7

Our Lady's Children's Hospital, Crumlin		
Document Name: Use of Tissue Adhesive for Minor Laceration Repair in the Emergency Department		
Reference Number: UTAMLRED-11-2016-AMCD-V1	Version Number: V1	
Date of Issue: November 2016	Page 3 of 8	

## 1.0 Introduction

Traumatic wounds, including lacerations, are a common reason for children to present to the Emergency Department (ED). Over the period of the 1<sup>st</sup> of October 2015 to the 1<sup>st</sup> of October 2016 a total of 1,641 children were treated for lacerations in the ED of this hospital (in context, this figure represents approximately 4.4% of all ED attendances). The management of these lacerations involves cleaning the wound and then re-approximating the wound edges until natural healing occurs. Without proper closure, the child is at increased risk of infection and excessive scar formation, which results in a poor cosmetic outcome (Hollander 1999).

Traditionally, closure of these lacerations has been accomplished using sutures, which either dissolve after a number of days, or require another visit for removal. Insertion of sutures requires a local anaesthetic in older children to reduce the pain associated with the procedure. However, infiltration of the wound with a local anaesthetic can be quite painful. Small children with lacerations pose further challenges, as they may require sedation and / or general anaesthesia to reduce or avoid pain, emotional distress and movement during the procedure. This adds time and complexity to the child's ED visit (Osmond 1999; Osmond 2000). Other standard wound closure options include staples and adhesive strips.

For many years, tissue adhesive compounds (glue) made from cyanoacrylates have been available to close simple lacerations. These compounds are supplied as liquid monomers (substances that bind chemically to other substances to form chains known as a polymer) that quickly form a strong bond over the approximated wound. This keeps the edges together until healing has occurred. They are relatively painless for the child and provide an excellent cosmetic outcome (Osmond 1999; Osmond 2000; Sells 1999). No follow-up appointment for suture removal is required and they have been proven to be a cost-effective alternative to sutures (Osmond 1995). Tissue adhesive has also been shown to act as a barrier to microbial penetration as long as the adhesive film remains intact (Vygon 2011).


## 2.0 Definition of Guidelines

Tissue adhesive (currently used in OLCHC) is a topically applied solution of n-butyl 2-cyanoacrylate monomer that bonds to the outermost layer of skin to form a seal over the apposed edges of a laceration (Vygon 2011, Bruns and Worthington 2000). The product (*Indermil flexifuze 0.75g*) is for single patient use only (multiple use in different children increases the possibility of transfer of infectious agents (Vygon 2011)).

## 3.0 Indications for use

Tissue adhesive is an acceptable alternative to standard wound closure for repairing simple traumatic lacerations, specifically:

- Closure of minor skin wounds (usually less than 3 cm in length)
- Low-tension wounds on the scalp, face, trunk and limbs
- Clean wounds with easily-aligned edges

Our Lady's Children's Hospital, Crumlin		
Document Name: Use of Tissue Adhesive for Minor Laceration Repair in the Emergency Department		
Reference Number: UTAMLRED-11-2016-AMCD-V1	Version Number: V1	
Date of Issue: November 2016	Page 4 of 8	

### **Contraindications** (Vygon 2011)

- Known allergy or sensitivity to tissue adhesive (cyanoacrylate or formaldehyde)
- Deep wounds
- Wounds involving internal organs, blood vessels or nerve tissue
- Wounds involving mucosal surfaces or mucocutaneous junctions
- Wounds in areas with dense natural hair (scalp wounds may be closed with tissue adhesive using meticulous care so as not to allow excess adhesive to run through the hair [Bruns and Worthinton 2000])
- Wounds within the conjunctival sac of the eye
- Wounds involving flexor or extensor surfaces (under tension)
- Chronic or infected wounds
- Known preoperative systemic infections
- Uncontrolled diabetes
- Diseases or conditions that are known to interfere with the wound healing process

### **Complications**


- Local sensitisation reactions may occur (Vygon 2011).
- The polymerisation process is exothermic (i.e. releases heat) and application of tissue adhesive can cause some very mild pain (heavy application may cause thermal damage to the tissue and delay healing) (Vygon 2011).
- A small (but statistically significant) increased rate of dehiscence (wounds breaking open) with tissue adhesives has been observed (Farion et al. 2009)

### **Safety Precautions** (Vygon 2011)

Tissue adhesive will readily adhere to most substrates and care should be taken to avoid unwanted contact during the polymerisation period (for example, the wearing of correctly-sized and well-fitting gloves will reduce the risk of accidentally bonding the glove to the skin). Polymerised tissue adhesive can be removed from metal instruments with acetone.

Where accidental contact with skin occurs:

- Do not pull the skin apart.
- Accidental bonding may be reversed by peeling apart with the aid of warm soapy water. Pre-soaking in a 5% solution of sodium bicarbonate may assist separation.

Our Lady's Children's Hospital, Crumlin		
Document Name: Use of Tissue Adhesive for Minor Laceration Repair in the Emergency Department		
Reference Number: UTAMLRED-11-2016-AMCD-V1	Version Number: V1	
Date of Issue: November 2016	Page 5 of 8	

Exercise particular caution when using tissue adhesive in the vicinity of the mouth and the eye. If the forehead or the vicinity of the eye is to be glued, an eye pad or petroleum jelly (*Vaseline*) should be applied to avoid any glue dripping into the eye or onto the eyelashes.

Where accidental contact with the eye occurs:


- Do not force the eye open.
- If the eye is bonded closed, release eyelashes with warm water by covering with a wet pad. In addition, natural weeping of the eye may occur which will help to debond the adhesive.
- Keep the eye covered until debonding is complete – usually within 1 to 3 days.
- Examination of the eye (by a doctor) will be required as solid particles of cyanoacrylate trapped behind the eyelid may cause abrasive damage.

#### 4.0 Guidelines for Equipment


- Sterile dressing pack
- Sterile gauze
- Sterile 0.9% sodium chloride for wound irrigation / cleansing
- Gloves
- Tissue adhesive
- Steri-strips

#### 5.0 Procedure for the application of tissue adhesive

ACTION	RATIONALE & REFERENCE
Prior to the procedure, consider the use of topical wound anaesthesia (see guideline on LAT gel).	To minimise discomfort to the child during the procedure.
Explain and discuss the procedure with the child and / or parent.	To ensure the child and / or parent understands the procedure and is provided the opportunity to ask questions (Hockenberry 2006).
Assist the child into an appropriate position.	To make it easier to apply the tissue adhesive and provide the nurse with a safe working position (Cole et al. 2008).
Open the dressing pack and prepare all equipment for the procedure using an aseptic non-touch technique (level 3) – remember the contents of the foil pouch in which the tissue adhesive is packaged are sterile prior to opening.	To reduce the risk of cross-infection (OLCHC 2005, OLCHC 2007).
Holding the container with the nozzle uppermost,	To remove any excess tissue adhesive from the tip of the ampoule prior to opening and reduce the

Our Lady's Children's Hospital, Crumlin		
Document Name: Use of Tissue Adhesive for Minor Laceration Repair in the Emergency Department		
Reference Number: UTAMLRED-11-2016-AMCD-V1	Version Number: V1	
Date of Issue: November 2016	Page 6 of 8	


flick the tip of the tissue adhesive ampoule.	risk of accidental bonding (Vygon 2011).
Twist and remove the cap to open the vial (retain the cap until procedure is completed).	Retaining the cap allows resealing of the ampoule prior to disposal (Vygon 2011).
Attach the fine tip precision cannula (applicator) to the ampoule with a twisting motion.	To allow controlled application of tissue adhesive to the wound (Vygon 2011).
Conduct the procedure following standard precautions and using an aseptic non-touch technique (level 3).	To reduce the risk of cross-infection (OLCHC 2005, OLCHC 2007).
Check the wound for foreign bodies and remove any if present.	To optimise the wound healing process and to reduce the risk of wound infection (Osmond 2000, RCH 2012).
Clean and dry the wound thoroughly and ensure the area is free from excessive blood.	To provide effective wound closure (placement over currently bleeding wounds reduces the tensile strength of the bond) (Cole et al. 2008, RCH 2012).
Ensure that wound edges appose readily.	To enable the wound to heal effectively (Osmond 2000).
Hold the wound edges together with fingers (enlist the help of a second member of staff if necessary), forceps or other appropriate method and apply adhesive sparingly (as a very thin film) along the length of the wound, either intermittently or in a continuous line. <b>Light pressure is sufficient to express the tissue adhesive.</b>	To optimise the wound healing process (Osmond 2000, Cole et al. 2008, Vygon 2011).
Avoid adhesive entering the wound.	Tissue adhesive is non-absorbable and will act as a foreign body (Vygon 2011, RCH 2012) and may cause excessive scarring and / or increase the risk of infection (Cole et al. 2008).
Continue to hold the wound edges together with light pressure for 30 seconds or until the adhesive is dry.	To allow the adhesive to set (Cole et al. 2008, Vygon 2011).
Steri-strips may also be applied to the wound (no secondary dressing is necessary)	To keep wound edges in correct position and to reinforce healing process (Osmond 2000, RCH 2012).
Remove the fine tip precision cannula (applicator) with a twisting motion and re-fit the reversed winged cap to the ampoule. Dispose of the applicator and	To reduce the risk of needle stick injury and to avoid excessive tissue adhesive leakage or

Our Lady's Children's Hospital, Crumlin		
Document Name: Use of Tissue Adhesive for Minor Laceration Repair in the Emergency Department		
Reference Number: UTAMLRED-11-2016-AMCD-V1	Version Number: V1	
Date of Issue: November 2016	Page 7 of 8	

ampoule to the sharps bin or clinical waste.	secondary use of the product (Vygon 2011).
Nursing documentation should be completed detailing the procedure and the condition of the wound.	To maintain accountability through accurate recording of nursing care (ABA 2002).
Ensure patient information leaflet and verbal aftercare advice is given.	To ensure the child and / or family are aware of aftercare and to allow any concerns or questions to be addressed (Cole at al. 2008).

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Our Lady's Children's Hospital, Crumlin		
Document Name: Use of Tissue Adhesive for Minor Laceration Repair in the Emergency Department		
Reference Number: UTAMLRED-11-2016-AMCD-V1	Version Number: V1	
Date of Issue: November 2016	Page 8 of 8	

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