Skin biopsy: punch method

The skin is complex with an array of functions. It is the body's largest organ, protecting the deeper tissues and organs from mechanical damage, chemical damage, bacterial damage, ultraviolet radiation and thermal damage. The skin aids in regulating body temperature, in excretion of urea and uric acid and also synthesis of vitamin D (Marieb 2012).

Children and young people can present with a wide range of skin anomalies. Some of these can prove to be relatively normal whilst, in the extreme, others can be life threatening making timely assessment and accurate diagnosis crucial.

It should be noted that despite reference to the 'child' throughout, this guideline equally applies to the young person.

Many skin disorders can be diagnosed through direct observation and palpation but others may require referral to a dermatology specialist or expert. Children with a persistent skin problem or an unusual presentation may be referred to a dermatologist for further investigations in order to achieve differential diagnosis prior to initiating a clinically effective treatment regime. This may involve a microscopic or histo-pathological examination of the area of skin involved, or additional radiological imaging.

When a sample of the skin is required for the purpose of aiding an accurate diagnosis or further investigation, a minor surgical procedure is undertaken in order to obtain a biopsy sample. There are various techniques which can be used to perform a skin biopsy such as a punch biopsy, shave biopsy or surgical excision of part of a lesion (Nischal et al 2008).

A punch skin biopsy is considered the best technique to obtain diagnostic full thickness skin specimens (Zuber 2002). A circular blade is rotated into the skin through to the subcutaneous fat, obtaining a cylindrical specimen which is then histologically examined (Pickett 2011). Punch skin biopsies are useful in investigating neoplasms, pigmented lesions, inflammatory lesions and chronic skin disorders (Zuber 2002). The procedure may be performed in a procedure room on the ward, outpatients or operating theatre.

Only a Health Care Professional (HCP) that has been trained in this skill should undertake the punch skin biopsy. Any training should acknowledge the physical act of the procedure, psychological aspects and the sequence of events (Rationale 1). A training and competency document can be found in the appendix of this guideline, however consideration must be given to who is available to teach and assess competence prior to undertaking training (Appendix 1).

Prior to carrying out the biopsy the exact area to be biopsied must be considered as some conditions require affected and unaffected skin for diagnosis and therefore the biopsy is taken across the border of the lesion. Of equal importance is the age of the lesion as a biopsy performed too early or too late may provide a false negative result (Nischal et al 2008).

The HCP who undertakes this role should be responsible for ensuring that he/she works within their code of professional conduct. The newly trained HCP should continue to make him/herself aware of developments in practice, research and available products (NMC 2008)(Rationale 2).

A local anaesthetic is used when carrying out the procedure (Rationale 3).

Oral sedation may also be required (Rationale 4).

Cytogenetics and chromosomes specimens are sent via Biochemistry to:

NE Thames Regional Cytogenetics Unit

Fibroblast culture specimens are sent to:

The Enzymology Laboratory, Level 5 Camelia Botnar Laboratory, Great Ormond Street Hospital (GOSH).

Preparation of the child and family

Obtain verbal and written consent from the child and family for the procedure (Department of Health (DH) 2001, 2009; Nursing and Midwifery Council (NMC) 2008; Wellesley 2009)(Rationale 10).

Allow enough time between giving information to the family and child and performing the procedure (Rationale 11).

The child and family should be given the relevant written information leaflet on skin biopsy obtainable from the GOSH website (Rationale 12 and 13).

Inform the child and family of the following (Rationale 14, 15 and 16):

- that a punch skin biopsy is necessary
- the reason for the biopsy
- what it entails
- the potential risks of a punch skin biopsy
- are there any alternatives?
- the duration of the procedure
- the expected cosmetic outcome
- what happens afterwards?
- when to expect results

A play specialist and the child's named nurse can help the child to be adequately prepared for the procedure (Duffin 2012)(Rationale 17).

Discuss with the family and child the appropriate method of distraction the child will use during the procedure itself. Attempt to discover what techniques are most likely to consume his/her attention eg pop up books, musical books, and guided imagery where the child is encouraged to imagine something pleasant eg a favourite holiday (Nillson and Hallqvist 2013)(Rationale 18).

Preparation of equipment and environment

The child should be assessed for their sedation requirements (Rationale 19). If required, the child needs to be nil orally for two hours pre-sedation (Rationale 20).

Avoid using the child's own bed space or room. Use a clinical room (Rationale 21, 22 and 23).

The clinical area should be clean and an adjustable magnifying lamp available (Rationale 24).

If a medium is required for a skin biopsy sample it should be obtained from the appropriate laboratory. Ensure the laboratory request form has the correct information. Discuss with the laboratory what medium is required for the different types of biopsies.

The media cannot be sent by the pneumatic tube and should be collected by porters or delivered to the appropriate ward/clinical area or Outpatients department (Rationale 25).

The following equipment should be prepared:

Clean dressing trolley/tray or appropriate clean surface.

Skin biopsy pack.

Three packs of sterile non-woven swabs and two sterile towels (Rationale 26).

Disposable punch biopsy needle size 0.3mm to 0.4 mm, any smaller and the sample will not be suitable for histopathological examination (Nischal et al 2008).

2ml syringe.

Blue needle Fg 23.

Orange needle Fg 25.

Local anaesthetic, eg Lidocaine one per cent. Lidocaine with Adrenaline (Epinephrine) is a powerful vasoconstrictor, therefore decreasing bleeding in wounds. However this may be contraindicated in areas of end artery flow, ie fingers and toes. This can cause palpitations and tremors, so is therefore used with caution.

Wound closure strips, eg Steri-strips®.

A sterile occlusive latex free dressing, eg Cutiplast® size 7.2cmx5cm or Opsite® size 6.5cmx5cm (Rationale 27).

In patients with skin fragility use a non adhesive hypoallergenic dressing, eg Mepitel® (Rationale 28).

Two per cent chlorhexidine gluconate/70 per cent isopropyl alcohol solution applicator eg Chloraprep® (Rationale 29).

Sterile gloves.

Disposable plastic apron.

Electronic prescription or prescription chart.

Correctly labelled specimen pot containing the appropriate medium. This is decided by the type of investigation required (see above).

Parental role

Identify with the parent/carer their role throughout the procedure, adopting the appropriate method of distraction with the child to use during the procedure itself. The child's parent/carer may remain with their child if they wish to do so (Rationale 30).

Explain the procedure to the family and negotiate with them if they would like to apply the topical local anaesthetic cream to the biopsy area (Rationale 31).

Performing the procedure

Application of local anaesthetic cream

A topical local anaesthetic should be applied to the biopsy site prior to the procedure. Consult the child and family on the use of Ametop® cream. Check for previous allergic reactions to the cream and use Emla® if necessary. If Emla® is used ensure that it remains in situ for the appropriate time (Rationale 32). Application of local anaesthetic will reduce the pain of the procedure (Eidelman et al 2011). Special precautions may need to be taken with known atopic children, eg children with eczema.

The local anaesthetic used should be prescribed and checked according to the Medicines Administration Policy (Rationale 33).

Positioning the child

Whilst maintaining the dignity of the child, place the child in a comfortable position with the potential biopsy area exposed. Positioning of the child will depend on the site of the skin biopsy. Negotiate with the child and family the position of the child whilst ensuring the child is comfortable whilst the biopsy site is accessible. Encourage the parents to distract the child with their favourite toy or book (Rationale 34).

Consider moving and handling risks.

Preparation of the skin biopsy site

Perform a handwash (Your five moments of hand hygiene available to GOSH staff internally on the GOSHweb intranet site).

Put on the appropriate protective clothing.

Remove the local anaesthetic cream and wipe dry with a tissue or gauze. Confirm with the child, if appropriate, that the cream has caused numbness of the skin effectively.

The biopsy area should be cleaned for 30 seconds with an alcohol-based cleansing solution eg Chloraprep® and allowed to dry for another 30 seconds (Pratt et al 2007; Royal College of Nursing (RCN) 2010; DH 2003).

Checking and administration of the local anaesthetic

Check the child's name, date of birth, hospital number and allergies against the child's identification bracelet and the prescription chart (Rationale 35).

The local anaesthetic should be prepared using an aseptic non-touch technique. Draw up in a 2ml syringe with a blue needle and change to an orange needle (Rationale 36).

The HCP should warn the child that subcutaneous infiltration of the local anaesthetic will sting or cause a burning sensation. It should be injected subcutaneously using the 'spider technique', lifting a skin fold to ensure that the subcutaneous injection is achieved. This forms a 'bleb' or small bump (Winslow et al 1997; King 2003)(Rationale 37).

Time must be allowed for the anaesthetic to take effect. Wait minimum of three minutes before proceeding (Rationale 38).

Taking the skin biopsy sample

Stretch the skin perpendicular to normal relaxation lines at time of biopsy (Rationale 39).

Introduce an appropriate-sized disposable punch biopsy firmly at a perpendicular angle to the anaesthetised area of the skin surface (Rationale 40).

The sterile punch biopsy should be rotated through 45 degrees repeatedly with the cutting edge carrying the punch down onto the tissue and through to the subcutis (Rationale 41).

The guard on the sterile punch biopsy will prevent too deep a penetration (Rationale 42).

Withdraw the sterile punch biopsy whilst applying pressure on the puncture site with a non-woven swab. This should release the skin specimen.

If the sample is not released from the skin use the plastic disposable forceps and disposable scalpel or sterile scissors to cut the sample. Apply minimum pressure with the forceps as a crush injury alters the histological appearance of the tissue sample (Rationale 43).

Specimens taken for rare metabolic disorders should be removed using a disposable scalpel blade (Rationale 44).

Place the specimen in the appropriate biopsy medium and ensure container is correctly labelled (Rationale 45).

Apply continuous pressure to biopsy site for three to five minutes or until bleeding stops (Rationale 46).

For immunocompromised children, once bleeding has stopped apply some Fucidin® ointment to the site.

Dressing the skin biopsy site

Apply wound closure strips, eg Steri-strips® in a ‘star’ pattern (Rationale 47).

Once haemostasis has been achieved apply either:

- a dry dressing, eg Cutiplast® or Op-site® or
- a low-adherent dressing, eg Mepitel®, if the surrounding skin is fragile (Rationale 48)

Dispose of used equipment and sharps according to the Trust Waste Management Policy. Remove protective clothing and perform a handwash (Rationale 49).

Document the type of specimen, the time, date and site where the biopsy was taken (Rationale 50).

Place the sample in a protected polythene specimen bag and send it to the appropriate laboratory as quickly as possible by the portering team (Rationale 51 and 52).

Record the procedure in the child’s health care records (NMC 2008)(Rationale 53).

Time should be taken to give positive feedback to the child for tolerating the invasive procedure and to the parent/carer for their valuable contribution (Rationale 54 and 55).

Post procedural care

Once the procedure has been completed the child may return to their bed or the playroom (Rationale 56).

Observe the biopsy dressing 10 mins after completion of biopsy to ensure bleeding has fully ceased before discharging the child.

If sedation has been given, their level of consciousness and their vital signs must be assessed according to their Child Early Warning Score (CEWS) pre discharge (Rationale 57).

Assess the child's need for analgesia. Oral analgesia may be required if the child experiences pain or discomfort (Rationale 58).

The analgesia must be prescribed and administered according to the Medicines Administration Policy. Advise the family to give further analgesia when at home if the child continues to experience discomfort.

The dressing should be observed intermittently within the first 24 hours for any bleeding or signs of infection (Rationale 59).

Advise the parents to apply pressure to the dressing site if bleeding reoccurs at home. The child's doctor should be informed if bleeding is observed. The family/child's carer should be given clear instructions to contact their GP or health care professional if a problem occurs.

The site should be kept dry and left untouched for 48 hours (Rationale 60).

The dressing may be removed after 48 hours.

The Steri-strips® may begin to fall off. Allow this to happen. If still intact they may be removed after the third day. Many children prefer to remove their own dressings by soaking them off in the bath or shower (Rationale 61).

Once skin edges have sealed, bathing or showering is not likely to cause any further risk (Rationale 62).

Healing in immune-compromised children may be delayed because of reduced efficiency of the immune system. Secondary to this is a decreased resistance to infection, which in turn will delay healing (Butcher 2013).

Immune-compromised children may be prescribed a prophylactic topical antibiotic. Patients with an uncomplicated laceration do not usually develop an infection and therefore do not require antibiotics thereby reducing the risk of developing resistance (Butcher 2013).

If a topical antibiotic is prescribed, the first application is applied after haemostasis has occurred (Rationale 63). The second application should be made 48 hours after the procedure when the dressing is removed.

The topical antibiotics must be prescribed and administered according to the Medicines Administration Policy (Rationale 64).

A written instruction sheet on the care of the biopsy site must be given and explained to the main parent/caregiver on discharge. It should also include parent education about the wound healing process, which should include a discussion of when the child can return to their normal activities (Rationale 65).

An outpatient's appointment must be given to family (Rationale 66).

The child and family must be informed of the results of the procedure as soon as possible, although they should be advised it can take six to eight weeks to grow the skin cells and a further six to eight weeks for the biopsy results to be available dependant on the nature of analysis of the biopsy (Rationale 67).

This discussion must be recorded in the child's health care records (NMC 2009)(Rationale 68).

Rationale

Rationale 1: To ensure consistent and safe practice.
Rationale 2: To ensure that his/her knowledge remains valid, up to date and his/her practice is safe and efficient.
Rationale 3: To minimise pain, stress and anxiety.
Rationale 4: In receiving sedation, the patient is better able to tolerate the overall procedure.

Rationale 5: To minimise the risk of infection.
Rationale 6: To aid diagnosis.
Rationale 7: Clinicopathological correlation aids in providing diagnosis in complex cases (Grace et al 2007).
Rationale 8: To minimise visible scarring and provide a good cosmetic outcome.
Rationale 9: To prevent contamination and to safeguard the HCP performing the procedure.
Rationale 10: To ensure that informed consent is obtained and to allow the family to develop coping strategies.
Rationale 11: If too much or too little time is allowed, the child will become anxious. The better informed the child the better able he/she will be able to develop coping strategies.
Rationale 12: To address any information requirements and provide post procedural care advice.
Rationale 13: To empower the child and family and alleviate any worries or concerns.
Rationale 14: To obtain informed written consent according to hospital policy.
Rationale 15: To minimise anxiety.
Rationale 16: To empower the family.
Rationale 17: To prepare the child according to their age and cognitive development in language that they can understand avoiding jargon.
Rationale 18: To prevent the child's whole attention being centred on the invasive procedure. These techniques can help to distract and relax the child.
Rationale 19: To facilitate compliance and minimise anxiety.
Rationale 20: To minimise risk of vomiting and potential aspiration.
Rationale 21: All equipment is close at hand.
Rationale 22: To ensure the child's own bed space remains a safe haven.
Rationale 23: Greater privacy for the child and family.
Rationale 24: To allow good visualisation of the biopsy area.
Rationale 25: To prevent leakage and contamination, which may prevent the skin cells from growing.
Rationale 26: Some literature suggests that fibres shed from cotton wool swabs can become entwined in tissue and create foci for infection.
Rationale 27: To protect the wound from further insult, keep the wound clean, and provide a moist environment that promotes healing.
Rationale 28: To prevent further breakdown of fragile skin.
Rationale 29: Active against a wide range of gram-positive and negative organisms.
Rationale 29: To protect the wound from further insult, keep the wound clean, and provide a moist environment that promotes healing.
Rationale 30: To minimise anxiety to the child and to empower the family/carer.
Rationale 31: Parents are better able to gain their child's co-operation.
Rationale 32: The minimal time for Ametop® is 30 minutes. The optimal application time for Emla® to achieve 95 per cent anaesthesia to the area is 90 minutes.
Rationale 33: To meet hospital policy requirements.
Rationale 34: To reassure the child and help reduce the pain.
Rationale 35: To identify the patient and prevent a medication error.
Rationale 36: To minimise the risk of infection.
Rationale 37: Less adipose tissue the greater risk of intramuscular injection.
Rationale 38: To gain maximum benefit from the anaesthesia and to ensure that it is effective.
Rationale 39: To immobilise the skin and increase the likelihood of gaining a more satisfactory cosmetic appearance.
Rationale 40: To facilitate effective biopsy taking.
Rationale 41: To ensure that the full thickness of the deeper dermis is obtained.
Rationale 42: To avoid damage to underlying tissue and to minimise pain and bleeding.
Rationale 43: To obtain sample and prevent damage to the fibroblasts and skin tissue.
Rationale 44: To ensure that the fibroblasts on the skin are not damaged.
Rationale 45: To prepare for laboratory analysis to enable correct analysis and correctly identify the patient.
Rationale 46: To achieve haemostasis.
Rationale 47: To ensure the edges of the wound are drawn carefully together so as to promote effective healing and improve cosmetic outcome. Steri-strips® work best in superficial low-tension wounds. It is inexpensive, easy and painless to apply.
Rationale 48: To protect the site and minimise infection, in order to maintain comfort and prevent further irritation and

provide a moist environment that promotes healing.
Rationale 49: To meet hospital policy and to prevent an inoculation injury reducing the risk of cross infection.
Rationale 50: To enable analysis to take place.
Rationale 51: Depending upon the medium used, there is a risk of chemical injury to those handling the sample.
Rationale 52: To meet the Control of Substances Hazardous to Health Regulations (COSHH) and Health and Safety Regulations (Health and Safety Executive 2002).
Rationale 53: To maintain an accurate record.
Rationale 54: To conclude the procedure with a positive outcome.
Rationale 55: To acknowledge the value of the involvement of the parent/carer.
Rationale 56: To facilitate safety and comfort.
Rationale 57: To ensure the child is awake and orientated prior to discharge.
Rationale 58: To relieve pain and to promote comfort.
Rationale 59: To detect early signs of biopsy site complications as early detection prevents complications and poor wound healing (Tickle 2013).
Rationale 60: To minimise the risk of infection.
Rationale 61: Consider wound healing within the context of the child's childhood disorder.
Rationale 62: To allow normal hygiene practices to resume.
Rationale 63: To prevent infection.
Rationale 64: To meet hospital policy.
Rationale 65: To keep the child and family informed and ensure post procedural advice is provided.
Rationale 66: To inform parents of results and to recommend future action/treatment
Rationale 67: This may be due to time taken for the growing of skin cells.
Rationale 68: To provide an accurate record.

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Appendices

Appendix 1: Punch skin biopsy workbook

Document control information

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