

## Bone Marrow Aspirate and Trepine Sampling

# Haematology/Oncology Unit BSUH Local Standard Operating Procedure

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## 1.0 Introduction

Bone marrow aspirates and trephines are carried out routinely for the diagnosis and follow up of haematological disorders, staging of solid tumours and occasionally for the diagnosis of certain infections. These guidelines have been developed to standardise practice among medical and nursing staff, allowing for good quality and appropriate samples to be taken from all patients and to form the basis of a teaching program for training nurse practitioners.

## 2.0 Abbreviations & Definitions

INR:	International normalised ratio
SATS:	Saturations
EDTA:	Ethylenediaminetetraacetic Acid
ACD-A:	Anticoagulant citrate dextrose solution A
FISH:	Fluorescent <i>in situ</i> hybridisation
BM:	Bone marrow
PB:	Peripheral blood
IgH:	Immunoglobulin heavy chain
PGD:	Patient Group Directive
FBC:	Full Blood Count

## 3.0 Scope

This policy applies to haematology medical staff and senior nurses (Band 7 or higher) being trained to carry out bone marrow aspirates/trephines at Brighton and Sussex Universities Hospital (BSUH)

## 4.0 Stakeholders/Responsibilities

Nurse training will be led by Victoria Tindell (Consultant Haematologist) and will be aided by the haematology specialist registrar.

## 5.0 Related Documents

5.1 Bone Marrow Booking form (Appendix 1)

5.2 Patients Guide to having a Bone Marrow Biopsy  
<https://www.cancerresearchuk.org/about-cancer/cancer-in-general/tests/bone-marrow-test>

5.3 Lidocaine PGD

5.4 Entonox PGD  
<https://www.bsuh.nhs.uk/EasysiteWeb/getresource.axd?AssetID=369341&type=Full&service=Attachment>

## Equipment, Reagents and Materials

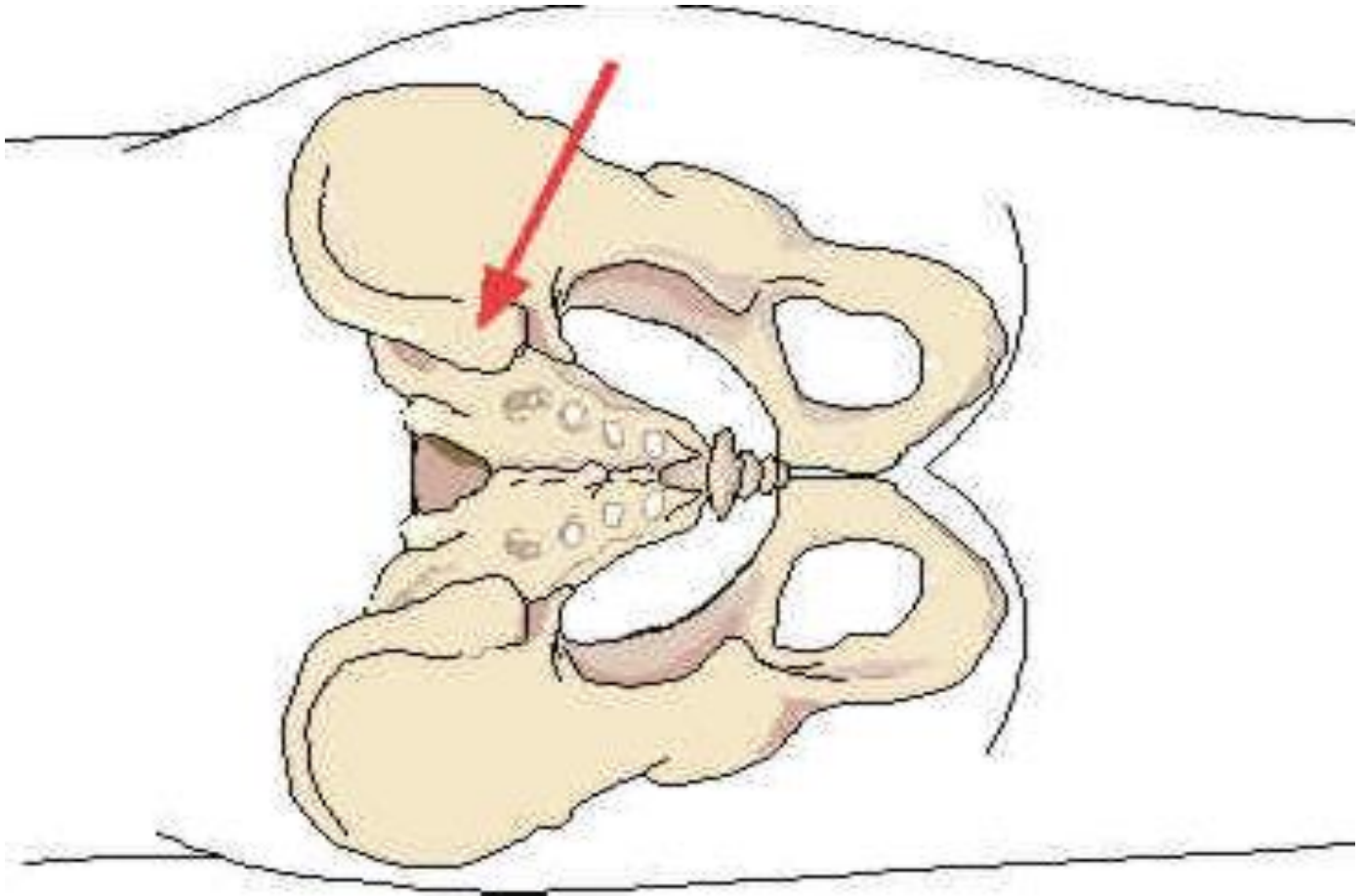
- 6.0 Small dressing pack and sterile gloves
- 6.1 2% Chlorhexidine cleaning solution
- 6.2 Bone Marrow Aspirate needle - size determined by patient size.
- 6.3 If a biopsy is to be performed an adult disposable trephine needle will be required. This will be laid out on the trolley as above along with a universal container containing a small amount of formalin in which to place the trephine for analysis.
- 6.4 2x10ml syringe and 2.5ml syringe, 25g (orange hub) and 2x21 g (green hub) needles for local anaesthetic
- 6.5 Dry dressing such as Tegaderm with pad
- 6.6 Lidocaine 2% 10mls as per PGD
- 6.7 Slides for immediate spreading of marrow.
- 6.8 Pencil for labelling slides
- 6.9 Appropriate specimen tubes. According to samples needed
- 6.10 Formalin Pots for Histopathology samples
- 6.11 Entonox Cylinder (if required and only if competency has been achieved via IRIS e learning)
- 6.12 Disposable single use mouth piece (if required)

## 7.0 Pre-Procedure

- 7.1 Patient identification should be verified prior to the procedure.
- 7.2 Ensure that a full explanation has been given to the patient and that written consent has been obtained, highlighting risks of bleeding, bruising, haematoma, pain and infection. If patient requires Entonox then the Entonox checklist should be completed and the patient should be shown how to use the Entonox equipment.
- 7.3 Establish patients medical and family history and rule out any bleeding disorders or use of anti-coagulants
- 7.4 Prior to performing the procedure, ensure that it is clear which specimens are required and that appropriate containers are available.
- 7.5 Confirm that patient's bloods are within normal range and administer any platelets/drugs that may be required. (INR  $\leq$  1.5). If a full blood count (FBC) has not been taken within 7 days of the procedure the patient should have an FBC taken on the day of the bone marrow

## 8.0 Bone Marrow Sampling

### 8.1 Bone Marrow Aspirate - **Posterior iliac crest (PIC)**

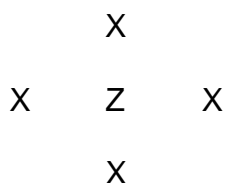


Right Posterior Iliac Crest

**8.2** Wash hand thoroughly and apply a disposable apron

**8.3** Lay out a sterile trolley and put on sterile gloves

- 8.4** The patient is placed in a right or left lateral decubitus position with their knees flexed, a pillow under their head, and their eyes away.
- 8.5** The patient's back should be carefully palpated to identify anatomical landmarks and the appropriate anatomic site for marrow sampling.
- 8.6** An aseptic, non-touch technique should be adopted. If using Entonox, the patient should be asked to start breathing the gas via the mouthpiece to ensure optimum levels when the procedure starts
- 8.7** The skin surrounding the procedure site should be cleaned as follows using 2 % chlorhexidine (Chloraprep):
- 8.8** Scrub skin thoroughly using an abrasive technique and wait 1 min for Chlorhexidine to dry completely.
- 8.9** Infiltrate the subcutaneous tissue and periosteum with local anaesthetic and pause to allow it to work. The bulk majority of the lidocaine (at least 80% in the sequence below) should be placed at the periosteum rather than subcutaneously. 1.5ml at each site of X and 2ml at Z:



- 8.10** Where X and Z are points of infiltration at the periosteum and Z is where you want to sample – this configuration gives flexibility to change direction/area should Z not be a suitable site for whatever reason (needle skips, cortex too weak to hold the needle)
- 8.11** Advance the needle with steady pressure and a slight twisting motion to the centre of the posterior iliac prominence Decreased resistance indicates penetration of cortex and entry into the marrow cavity.
- 8.12** Advance needle about 1 cm into the marrow cavity. Attach a 5 ml syringe to the aspirate needle. Quickly (< 5 seconds) aspirate 1-2 mls marrow into the syringe (more than this dilutes the specimen with peripheral blood). Repeat for each sample required.
- 8.13** Samples going into EDTA/Lithium heparin or ACD-A tubes need to be mixed immediately to prevent clotting. (When aspiration is impossible, repeat aspiration using a 10ml syringe)

**When multiple specimens are needed then either rotate the needle before each aspiration to avoid haemodilution, or change needle position.**

- 8.14** Slides should be allowed to dry before inserting into plastic container as insertion of wet slides into a closed container can lead to red cell lysis making morphology difficult to assess.

## 9.0 Bone Marrow Trepine

A bone marrow trephine will normally be performed at the same time as a bone marrow aspirate. The aspirate should be done first followed by the trephine. Additional anaesthesia is not normally required.

- 9.1 Locate the site as before.
- 9.2 Obtain a biopsy needle and inspect for bent, loose, or almost-broken parts. Remove obturator and inspect. Reinsert obturator and lock with a twist.
- 9.3 Hold biopsy needle with hub in palm, index finger tip on skin to control needle penetration. Insert through skin incision site. Steady the advance of the needle with the other hand between thumb and index finger.
- 9.4 Using steady pressure, advance biopsy needle to the bone. At bone, advance needle through cortex with forceful rotating movement -- decreased resistance (usually) indicates entry into marrow cavity.
- 9.5 Remove obturator when needle is firmly anchored in bone. Advance needle 1-2 cm more with continued "back and forth" rotation. An ideal biopsy core is 2 cm or greater in length.
- 9.6 Break off the biopsy specimen from the surrounding bone by vigorously rotating the needle 360 degrees several times while applying slight pressure.
- 9.7 Decreased resistance to rotation usually indicates detachment of the core from the surrounding bone.
- 9.8 Rotate needle during withdrawal through bone, periosteum, and skin. Apply pressure to biopsy site until bleeding and oozing ceases.
- 9.9 Place specimen into sterile universal container containing formal saline.
- 9.10 If the aspirate was a dry tap and a good trephine specimen was achieved it is possible to view cell morphology by doing a trephine roll. Gently place the trephine on a microscope slide and using a second slide roll the trephine GENTLY along the slide. Then place the trephine in the formal saline. These slides can be fixed and stained as usual.
- 9.11 Apply a dry dressing to the site and position the patient to lie on their back for 10 minutes so that pressure continues to be applied to the site
- 9.12 Observing universal precautions, all used needles, contaminated slides or tubes should be carefully disposed of in the 'sharps bins for incineration'.
- 9.13 Other contaminated materials e.g. swabs and drapes should be disposed of in the yellow plastic bin bags for incineration.
- 9.14 Label all specimens with the patient's name, date of birth, hospital number and date of collection

## **10.0 Blood/Bone Marrow Spillage**

- 10.1** Wearing disposable gloves cover the spillage with Clinell Spill wipes as per the package instruction

## **11.0 Labelling Forms and Specimens**

- 11.1** High risk specimens should be identified.
- 11.2** The bone marrow slides should be labelled using a pencil with the patient's hospital number, first and surname and date of sample as a minimum.
- 11.3** All specimen pots and forms should be labelled with at least 3 points of identification e.g. Name, Hosp. Number and Date of Birth
- 11.4** Samples for molecular testing or for sending away vary in numbers of 4mL EDTA bottles required. Refer to King's referral form for information.
- 11.5** All labelling should be done at the time of the procedure to prevent sample interchange.

## **12.0 Transportation of Samples**

- 12.1** Slides should be transported in a glass slide specific plastic container or slide tray
- 12.2** An effort should be made to ensure that all lids are securely placed on EDTA and ACD-A tubes and tightly screwed onto the universal containers containing the cytogenetics and histology specimens.
- 12.3** All specimens should be placed into a sealed plastic bag with the appropriate request form. No samples or forms should be sent which have been contaminated by blood or bone marrow.
- 12.4** Samples should not be transported in the POD system
- 12.5** All samples should be taken directly to the immunohaematology laboratory at BSUH for processing. The laboratory staff will send specialist MRD samples onto the relevant laboratories.



## 13.0 Training

<b>Type of Training</b>	Training required and defined.
<b>Method of competency assessment</b>	<p><b>Initial Training:</b> Nurse Training is completed as part of the <a href="#">Haematology /Oncology Local Competencies; Supportive Care Extended Role, Bone Marrow Aspirate Competency</a> Observed Practice by Trained Staff</p> <p><b>Annual Renewal:</b> All nursing staff signed off to perform BMA procedures must submit the following self-certification of BMA competency annually in order to be allowed to continue carrying out procedures. Appendix 2</p>
<b>Who is to perform this training</b>	Designated medical practitioner (haematologist consultant or haematologist registrar)

Reference:

<https://www.cancerresearchuk.org/about-cancer/cancer-in-general/tests/bone-marrow-test>

[http://www.islh.org/web/downloads/ICSH\\_Standards/ICSH\\_Guidelines\\_for\\_Bone\\_Marrow\\_Lee\\_Oct\\_2008.pdf](http://www.islh.org/web/downloads/ICSH_Standards/ICSH_Guidelines_for_Bone_Marrow_Lee_Oct_2008.pdf)

**Appendix 1**

**Patient Details**

Name:

DOB:

Hospital No. :

NHS No. : .....

Ward: .....

Lab use only

Consultant

Location

\*Date

\*Operator

\*Site

\_\_\_\_\_ \* To be completed at booking/procedure

Diagnosis/Indication:

Clinical Trial? If Yes, please state: \_\_\_\_\_

Investigation required		Please tick
Aspirate morphology		
Iron stain		
Immunophenotyping	BSUH	
	KCH	
Cytogenetics/FISH(5ml cyto tube/Li Heparin) Please specify: _____		
Molecular (KCH) NPM1/FLT3 initial screen, PML-RARA diagnosis, all BCR-ABL, chimerism, other <b>diagnostic</b> specimens. (King's form also needed) Please specify: _____		
Molecular (Guy's) NPM1, PML-RARA and other AML <b>MRD monitoring</b> Please specify: _____		
Trepine		X

## Appendix 2

# Bone Marrow Aspirate and Trepine Sampling

## Annual Self-Assessment Certificate

**Name:**

In the last year I have completed a minimum of 10 Bone Marrow Aspirates & Trephines and I feel confident / competent enough to continue performing the procedures as trained

I have read the most recent version of the Bone Marrow Aspirate & Trepine Sampling standard local procedure and I have completed the mandatory infection prevention training.

Ward/Area:

Date:

Job Role: