Abstract: A device for marking coetaneous landmarks, as a means of identifying orientation of the structure under x-radiography. The device is comprised of a functionally reversible strip of suitable material, cut through or marked by radio-opaque letters and placed over a coetaneous landmark on a patient's body and then x-raying the area of interest. The new device is designed to be used reversed and/or flattened to suit various imaging positions such as anterior-posterior, posterior-anterior, prone or supine without needing a different marker each time.
FLEXIBLE X-RAY MARKER

DESCRIPTION

BACKGROUND:

1. Field of the Invention

The invention relates to the field of devices, providing coetaneous, viz. to be placed upon the skin of the patient, based markings in association with x-ray examination procedures.

Particularly, the invention relates to a marker device designed to be used as a single piece, thus eliminating the use of two or three separate, different types of markers for various procedures. This is used to encompass and define the position of the patient under examination in such a way that it can later be correlated with the relevant x-ray image.

2. Description of the Prior Art

In the field of radiography there is often the need to image patients in various positions, i.e. anterior-posterior (AP), posterior-anterior (PA), supine or prone. The X-ray identification markers are used to correctly denote and correlate patient positions with those of the obtained the images.

The existing identification markers are not flexible enough to provide for all possible imaging requirements. These are either rigid U shaped markers (Fig. Ia) that come in pairs for AP/PA positions and can not be used flat unless bent out of shape.

Different designs currently available consist of two pieces of left and right markers (Fig. Ib) that are attached together via a flexible link of string/fabric ribbon. These can not be securely connected to x-ray cassette and over time often get separated and lost. The linking string/fabric material also carries risk of cross infection and needs to be cleaned and decontaminated rigorously.

The initial idea for this invention came as a design to replace a pair of the current U shaped markers with a single device made of metal that would
work both as an AP (Fig. 2a) and a PA marker. (Fig. 2b) During its development however, it seemed logical to design a device that can also be used as a flat marker for where a U shaped marker could not be used.

3. Embodiment of the Invention

The invention is a device for marking direction and orientation of the structure under x-radiography. This device is comprised of a functionally reversible strip of suitable material, cut through or marked by radio-opaque letters and placed over the imaging cassette or the patient's body and then x-raying the area of interest. It is designed to be a one piece marker as opposed to the current markers. It is designed to be reversed, and/or flattened, to suit various imaging positions such as anterior-posterior, posterior- anterior, prone or supine without needing a different marker in each case, thus saving time and money.
SUMMARY OF THE PRESENT INVENTION

The present invention overcomes the problem of using three types of x-ray markers for various x-ray imaging procedures, replacing them with one flexible marker.

It can be easily deployed on the cassette to show anterior-posterior (AP) or posterior anterior (PA) direction of the x-ray where the patient is standing; and can be made by the user into a flat strip marker to mark the area of interest where the patient is in prone or supine positions. (Figs. 5a & 5b)

The radio-opaque material used in the markers may be in powder, wire, or paint form. Metallic materials such as barium sulphate, aluminium and lead may also be used.

A marker is thereby formed which is thin and flexible enough that it will work both as attached to the edge of x-ray cassette as well as being flat to conform to the body surfaces to be evaluated.

A single thin and flexible marker that is easy to clean and decontaminate will reduce the need for various types and forms of markers, that in use all need to be cleaned and decontaminated to prevent cross infection.

To further assist the radiographer, the side pieces of the marker can be fashioned in distinct colours, corresponding to different sides of the image, i.e. left or right.

To use the marker, radiographer may reverse or flatten it according to the patient's position or the requirements of the procedure, and attach it to the cassette edge or place it on the area of interest. An x-ray photograph is then taken of the area of interest. The image of the marker denotes the orientation of the area of interest in the x-ray by indicating the original direction, left or right, of the taken image.

The present invention specifically addresses the problems listed above which currently confront radiographers in their various types of examinations. The novelty and utility of the present invention resides in its ability to perform as three different types of marker in one unit. It can assist radiographers to denote various areas of interest without being limited by the shape of their markers and the position of the patient; and being a single unit it is easy to remember using and collecting it and so does not get lost or separated into pieces. It is thin and flexible enough to
be readily applied to the irregular surfaces and has no fabric or otherwise absorbent parts to cause cross infection.
PREFERRED EMBODIMENT OF THE INVENTION

Method, by which the present invention is used, is illustrated generally in FIGS. 5&6.

The body of the invention is to be made of suitable material in consideration of its form and function. For the purposes of this application such material will need to be of biologically inert, non absorbent, readily sterilisable nature, with mechanical properties such that are amenable to ease of manufacture. In practical terms this will include, but not necessarily be limited to, different metals and metal alloys and various plastics.

Although the preferred embodiment of the invention has been described, it is to be remembered that the above description is merely illustrative. Other methods and materials may be employed to form the marker of the invention, including, but not limited to, the use of a radio-opaque spray-on paint or pre-forming of radio-opaque wires into the shapes of interest. In addition, radio-opaque materials other than lead may be employed in order to provide sufficient contrast to the marker encompassing the area of interest.
BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1a is a pair of the currently utilised U shaped markers used in pairs.
FIG. 1b is the current flat marker used separately.

FIG. 2a is the initial design idea for a reversible marker (position AP).
FIG. 2b is the initial design idea for a reversible marker (position PA).

FIG. 3a is a perspective of the final design for the flexible marker (position AP).
FIG. 3b is a perspective of the final design for the flexible marker (position PA).

FIG. 4a is the top view of the flexible marker.
FIG. 4b is the side view of the flexible marker and its possible direction of movement.

FIG. 5a shows how the marker is used on a flat surface.
FIG. 5b shows how the marker is attached to an x-ray cassette.
FIG. 5c shows how the marker is folded to produce a single letter (perspective).
FIG. 5d shows how the marker is folded to produce a single letter (plan).

FIG. 6a shows how the marker can be made of two strips of metal and a ring.
FIG. 6b shows how the ring is made.

FIG. 7a is the detail of the locking notch to keep the wings in a stable/parallel position (marker is made of metal strips).
FIG. 7b is the detail of the locking notch to keep the wings in a stable/parallel position (marker is made of plastic).
CLAIMS

I claim:

1. A functionally reversible marker device to be used in x-ray examinations, wherein the position of a patient or the orientation of an imaged structure is denoted by coetaneous as defined hereinabove landmarks, said marker device comprising:

   a. A three piece (u) shaped strip of a suitable material as defined hereinabove, that is hinged at the junction of the two longer side pieces, connecting to the shorter central piece, thus enabling them to be turned about their pivots at least 180° in either direction.

   b. This design would allow the side pieces to be opened from each side for 90° to flatten the device, or to be opened for 180° to reverse the device into an (n) shape. (Figs. 3 to 7)

   c. The side pieces are marked respectively with letters denoting (R) or (L) at the end of the longer pieces, opposite to the hinges. (Figs. 3a& 3b)

2. A marker device as claimed in claim 1, if made of metal, has the above mentioned letters as cut through, and in case of plastic markers, they are produced by application of a radio-opaque material in (R) or (L) marks.

3. A marker device as claimed in claim 2 wherein said radio-opaque material is affixed to said plastic surface of the marker by the process of etching and filling said letters by means of a suitable process ,e.g. vapour deposition.

4. A marker device as claimed in claim 3 wherein said radio-opaque material is lead.

5. A marker device as claimed in claim 1 wherein said wings are about 6x2 centimetres, hinged to an approximately 2x1.5 centimetres central piece so when folded to a u-shape that the perpendicular distance between the two side pieces are about 1.5 centimetres excluding the thickness of the side pieces themselves. (Figs. 3a& 3b)

6. A marker device as claimed in claim 1, wherein said is made of radio-opaque metal with thickness of about 1 millimetre or plastic material with thickness of about 2.5 millimetres.
7. A marker device as claimed in claim 6 wherein each of said hinges are shaped by bending and wrapping the edges of the metal side pieces around the centre piece, if made of metal. This piece can be solid, viz. cut out of a solid plane sheet, as (Fig 5c&5d) or to be made of a metal ring, viz. formed by bending a metal circular rod of appropriate size into a frame, as shown in (Figs. 6a, 6b & 7a).

8. A marker device as claimed in claim 6 wherein each of said hinges are formed by 4 millimetre thick, cylinder shaped attachments of each side piece that are each cut and drilled to accept a central metal pin. (Fig. 7b)

9. A marker device as claimed in claim 7&8 wherein each of said hinges are shaped with a notch so that they lock into position both in (u) or (n) state. (Figs. 7a&7b)