

IMPROVEMENTS IN SPLINTSBACKGROUND AND FIELD OF THE INVENTION

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This invention relates to a splint for supporting a limb.

Current commercial splints for supporting limbs that have intravenous cannulas in-situ are formed from a variety of materials. The splints are meant to be disposable, leading to high wastage and consequent expense. Such splints also are not very suitable for tropical climates since when patients sweat, the sweat is not absorbed by the splint and macerates the skin.

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Such problems with commercial splints have led medical institutions to find alternatives such as makeshift or home made splints formed from plain wood, plywood, aluminium, or cardboard, wrapped in cushioning pads and held together with sticking plaster. The quality of such splints is, however, variable, resulting in splints having inadequate padding and/or stiffness, which can in turn lead to injury.

Recycling of used splints imparts a significant risk of contamination by the previous patient's body fluids, blood, pus and other secretions. Pathogenic organisms can also colonize a reusable splint, risking the spread of nosocomial

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infections, while irritant contact dermatitis and allergic reactions can result from the contact of a patient's skin with antibiotic solutions that contaminated a reused splint.

- 5 Cleaning and sterilization of used splints is often impractical and time consuming and therefore often this essential step is not performed, even though the splint is reused.
- 10 It is an object of the invention to alleviate at least one of the aforementioned problems of such prior art splints.

SUMMARY OF THE INVENTION

- 15 According to the invention in a first aspect, there is provided in combination, a splint comprising a stiffening member, a cushioning layer surrounding the stiffening member and an impervious layer surrounding the cushioning layer; and a disposable cover.

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Preferably the stiffening member is bendable to a desired configuration and may be formed from sheet metal such as sheet aluminium. The cushioning layer may be formed from foamed material such as doubled-sided adhesive sponge tape.

- 25 The impervious layer may be formed from plastics material such as cloth-backed PVC.

The cover may be formed as a sleeve, may be absorbent, may be formed from non-woven paper and may be formed from a single sheet of material.

- 5 The cover may further be formed as one of (1) a single layer of absorbent material, (2) a bonded two layer sandwich of a non-woven fabric with wicking properties covering a layer of absorbent, non-woven material (3) a multiple layer sandwich incorporating an impervious innermost layer or (4) a two-
10 layer structure having an absorbent outer layer and an impervious inner layer.

According to the invention in a second aspect, there is provided, in combination, a splint comprising a stiffening
15 member, a cushioning layer surrounding the stiffening member and an impervious layer surrounding the cushioning layer; and a disposable cover for the splint, wherein the stiffening member is formed from sheet metal, the cushioning layer is formed from sponge tape adhered to the stiffening member, the
20 impervious layer is formed from sheet plastics material wrapping the cushioning layer and the cover is formed from absorbent paper.

The invention further provides a sleeve or a splint per se
25 used in the combination of either of the previous aspects

According to the invention in a third aspect, there is

provided a splint comprising a stiffening member, a cushioning layer surrounding the stiffening member and an impervious layer surrounding the cushioning layer adapted for use with the cover of the fourth aspect.

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According to the invention in fourth aspect, there is provided a disposable cover adapted for use with the splint of the third aspect.

- 10 The described embodiment of the invention provides a sterilizable, padded and electrically insulated splint which is sufficiently stiff to provide the required support but bendable to a desired support shape. A cover for the splint is provided. The cover is absorbent to absorb bodily fluids
15 and is disposable for hygiene purposes.

BRIEF DESCRIPTION OF THE DRAWINGS

An embodiment of the invention will now be described by way
20 of example with reference to the accompanying drawings, in which:

Figure 1 is a 3-dimensional view of an embodiment of the invention showing a part cut-away splint partially received
25 in a disposable cover;

Figure 2 is a plan view of the embodiment of Figure 1 showing

the splint enclosed by the sleeve; and

Figure 3 is a cross sectional view taken across A-A of figure 2.

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DESCRIPTION OF THE PREFERRED EMBODIMENT

With reference to the figures, a splint generally designated 10 is shown, received in a sleeve generally designated 50.

10 The splint has at its centre a stiffening member 12 formed from a rigid material such as sheet aluminium or plastics. The stiffening member forms a skeleton for the splint. Although not shown, the edges of the sheet may be rounded for safety.

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The length, breadth and thickness of the sheet is chosen in dependence upon the use of the splint. Ideally, the splint should be sufficiently rigid to provide the necessary support but at the same time should be able to be bent by the user so as to be usable with patients varying from small neonates to adults, for use on the upper limbs and on the lower limbs, and adaptable to a desired configuration for example to have a 90 degree bend (or a bend of another angle) to support a joint in the neutral position.

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The sheet 12 is covered with a 5-6mm layer 14 of foam cushioning, which may either be formed by moulding the foam

layer around the sheet 12 or by application of black sponge double sided adhesive tape to each side of the sheet 12 to sandwich the sheet 12. The layer 14 provides cushioning against the edges of the sheet 12 and increases user comfort,
5 as the splint may be in-situ for several days.

The layer 14 is covered with an impervious flexible cover layer 16, such as a heat-sealed PVC or polyethylene envelope. Alternatively, the cover layer 16 may be formed by cutting
10 a sheet of cloth-backed green PVC or equivalent to size, wrapping the layer 14 in the sheet and sealing the edges of the wrapping with impervious adhesive tape, such tape also preferably being used to reinforce the corners of the wrapping. The impervious layer allows cleaning to be carried
15 out easily and also insulates the sheet 12 from conducting electrical current, a risk which may arise, for example, during electrical cardioversion procedures.

The impervious layer makes the splint amenable to cold
20 sterilisation using currently available disinfectants at the ward level, such as alcohol, chlorhexidine, and Milton solution.

In special circumstances, the covering material can be varied
25 to make the splint amenable to gas or cold chemical sterilisation, such as for use in an oncology setting.

The splint 10 is covered with the disposable cover 50 which is formed from an absorbent non-woven paper such as Arlaid, (100g/m²). This material is soft, hypoallergenic, absorbent of sweat, and inexpensive enough to be used once and thrown
5 away. The cover material also provides additional padding.

The cover can be formed, for example, as (1) a single layer of absorbent material, (2) a bonded two layer sandwich of a 'stay dry' non-woven fabric with wicking properties, to
10 conduct sweat and moisture away from the skin, covering a layer of absorbent, non-woven material (3) a multiple layer sandwich in the manner of a sanitary pad incorporating an impervious innermost layer to prevent migration of potentially infectious fluid to the outer surface of the
15 splint 10 or (4) a two-layer structure having an absorbent outer layer and an impervious inner layer ; such a structure may be formed by applying an adhesive plastics sheet to one side of the absorbent layer prior to forming the cover.

20 The number of layers used will vary depending on user needs and settings and local cost constraints. The materials may be chosen to be hypoallergenic. The splint cover can also be sterilised easily by dry or moist heat (steam) or by gamma irradiation.

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In the present embodiment, the cover 50 is formed as a sleeve. The sleeve border is formed from a folded sheet of

material secured on two sides by sewing, heat bonding or chemical adhesive, and is slipped over the splint like a pillowcase, and then fastened on the free end by a small piece of adhesive tape 56, at the point of use, as shown in 5 Figures 3 and 4.

The strength of the sleeve fabric and the fact that it is fitted to the size of the splint allows the limb to be safely strapped onto the splint's outer covering, without coming 10 loose. Any sweat, blood, pus, or chemical substances are wicked away from the skin, reducing the risks of maceration, infection and blistering. After use, the sleeve 50 is discarded, and the splint 10 is cleaned at ward level and reused.

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The described embodiment lends itself to mass-production of splints of different sizes. However, the described embodiment also lends itself to being made on an ad-hoc basis by hospital staff according to need using simple, readily 20 available materials. For example, 1-2mm sheet aluminium could be cut to size and the edges rounded using tin snips and a file to form sheet 12. 5-6mm thick black sponge double sided adhesive tape could then be cut using dressmaking scissors to the correct size to surround sheet 12 and stuck 25 in place. Cloth backed green PVC could then be cut using scissors to form the cover layer 14 and wrapped around layer 12, sealed at the edges with adhesive PVC tape. The sleeve

50 could then be cut out from a sheet of absorbent paper, optionally sticking a layer of self-adhesive plastics sheet to one surface to form an impervious inner layer, and then folded and stitched using a sewing machine to the correct
5 size.

The described embodiment has application in both adults and children, or even in veterinary use, wherever a limb has to be gently but firmly supported.

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The primary use of the embodiment is expected to be in a hospital setting, for supporting limbs with intravenous cannulae in situ, but the embodiment is transferable to an outpatient or paramedic setting, where splints are currently
15 unprotected and can therefore transmit infection, such as for use by ambulance crews at road traffic accidents.

The embodiment described is not to be construed as limitative. For example, the materials from which the splint
20 and cover are made may be chosen according to requirements. Furthermore the cover 50 could be formed as a wrapping rather than a sleeve.

CLAIMS

1. In combination, a splint comprising a stiffening member,
a cushioning layer surrounding the stiffening member and an
5 impervious layer surrounding the cushioning layer; and a
disposable cover for the splint.
2. A combination as claimed in Claim 1 wherein the
stiffening member is bendable to a desired configuration.
- 10 3. A combination as claimed in Claim 1 or Claim 2 wherein
the stiffening member is formed from sheet metal.
4. A combination as claimed in Claim 3 wherein the
15 stiffening member is formed from sheet aluminium.
5. A combination as claimed in any one of Claims 1 to 4
wherein the cushioning layer is formed from foamed material.
- 20 6. A combination as claimed in Claim 5 wherein the
cushioning layer is formed from doubled-sided adhesive sponge
tape.
7. A combination as claimed in any one of Claims 1 to 6
25 wherein the impervious layer is formed from plastics
material.



8. A combination as claimed in Claim 7 wherein the plastics material is cloth-backed PVC.

9. A combination as claimed in any one of the preceding
5 Claims wherein the cover is formed as a sleeve.

10. A combination as claimed in any one of the preceding claims wherein the cover is absorbent.

10 11. A combination as claimed in any one of the preceding claims wherein the cover is formed from non-woven paper.

12. A combination as Claimed in any one of the preceding claims wherein the cover is formed from a single sheet of
15 material.

13. A combination as claimed in any one of the preceding claims wherein the cover is formed as one of (1) a single layer of absorbent material, (2) a bonded two layer sandwich
20 of a non-woven fabric with wicking properties covering a layer of absorbent, non-woven material (3) a multiple layer sandwich incorporating an impervious innermost layer or (4) a two-layer structure having an absorbent outer layer and an impervious inner layer.

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14. In combination, a splint comprising a stiffening member, a cushioning layer surrounding the stiffening member and an

impervious layer surrounding the cushioning layer; and a disposable cover for the splint, wherein the stiffening member is formed from sheet metal, the cushioning layer is formed from sponge tape adhered to the stiffening member, the
5 impervious layer is formed from sheet plastics material wrapping the cushioning layer and the cover is formed from absorbent paper.

15. A combination as Claimed in Claim 14 wherein the cover
10 is formed as a sleeve.

16. A combination as Claimed in Claim 14 or Claim 15 wherein the cover is formed from a single sheet of material.

15 17. A sleeve used in the combination of any one of the preceding Claims.

18. A splint used in the combination of any one of Claims 1 to 16.

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19. A splint comprising a stiffening member, a cushioning layer surrounding the stiffening member and an impervious layer surrounding the cushioning layer adapted for use with the cover of Claim 20.

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20. A disposable cover adapted for use with the splint of Claim 19.

