Wound dressing adherence: a clinical comparative study

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SUMMARY

This prospective study was undertaken to compare the adherence of dressings currently used as non-adherent dressings. Four different dressings were studied on a total of 40 patients. An overall adherence of 50% was encountered, Silicon Polymer Foam being the most successful under the trial conditions.

INTRODUCTION

One of the important properties required of the ideal dressing is non-adherence to the wound. A dressing which adheres to the wound may cause the patient pain and removal may damage the regenerating epithelium (Lawrence, 1982). The cause of adhesions is wound exudate which has entered the dressing and dried (Scales & Winter, 1961).

The range of dressings described as non-adherent has widened since the introduction of Tulle gras by Lumiere in the early 1900's, but there are few published comparative studies of dressing adherence to wounds in the clinical situation. *In vitro* tests have been described (Scales & Winter, 1961).

Medicated preparations of non-adherent dressings are available but, for the purpose of this study, the comparison is made between non-medicated dressings; four dressings have been compared.

Winter (1965) described adherence of perforated plastic films at the sites of perforation. A comparative clinical trial of adherence was carried out by Gentle in 1970 comparing Tulle gras, dry gauze and perforated plastic film (a perforated film adhered least). Lawrence, in a publication in 1977, records 16% of Tulle gras dressings adherent to burns, while the figure for Bactigras was 19% (no significant difference in that situation).

The need for a comparative clinical study of the property of adherence of wound dressings prompted this study.

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METHODS

The study was confined to wounds produced on removing the great toe nail as treatment for ingrowing toe nails. Excluded were those cases in which the surgical field was infected, cases where foot pulses were reduced or absent and in diabetics. Prior to surgery a proforma was completed for each patient, including random allocation of coded dressings (using the dressing codes A to D as described below).

- (A) *An open weave gauze prepared with paraffin*. For absorption of wound exudate, a further absorbent dressing must be applied over the gauze. This dressing essentially compares to Lumiere's Tulle gras.
Commercial name of product used 'Jelonet' produced by T. J. Smith & Nephew Ltd.
Cost: 10 cm × 10 cm £16.57 (120 dressings)
5 cm × 5 cm £ 3.33 (50 dressings)
- (B) *A knitted continuous filament viscose fabric*. Fraying (as with the cotton weave gauze) is avoided.
Commercial name 'Johnson & Johnson N/A' produced by Johnson & Johnson Ltd.
Cost: 9.5 cm × 9.5 cm £124.14 (720 dressings)
- (C) *A hydrocolloid dressing*. This has an outer protective polyurethane foam which is bonded to an inner layer composed of hydrocolloid particles and a hydrophobic polymer. The inner layer interacts with the wound exudate to form a hydrated gel which allows removal of the dressing without damage to the regenerating wound. This dressing is occlusive and waterproof.
Commercial name 'Granuflex' produced by Squibb Surgicare Ltd.
Cost: 10.16 cm × 10.16 cm £8.39 (five dressings)
- (D) *Silicon polymer foam*. A monomer solution is mixed with a catalyst at the time of wound application and the solution is poured on to the wound, where it polymerizes as a foam in the contours of the wound. This dressing can be reapplied by the patient (socially clean standards only, are required).
Commercial name 'Silastic foam dressing' produced by the Wellcome Foundation Ltd.
Cost: 10 × 20 g £51.00 (10 dressings)
From 1/10/86 Silastic foam sheeting has been available in sheet form (not included in this study) at a cost of £176.80 per 10 sheets (100 mm × 150 mm × 4 mm).

Operations were performed by a single independent operator under local anaesthesia (ring block) and digital tourniquet. Local pressure for 3 min was applied after release of the tourniquet, before dressing application. The dressings were not disturbed until the patient was reviewed 10 days later.

At review, the clinic nurse (who was aware of the trial but had no access to details of the operation notes for dressing selection) recorded the review information on a second proforma. Here the patients subjective comfort was noted in the period up to the dressing change and at the dressing change.

Pain in this clinical situation was assessed by the subjective method of asking the patients to state whether or not they had pain.

Dressings were classified as adherent if they required soaking for removal or if there

was macroscopic evidence of adherence. The presence or absence of bleeding at dressing removal was noted and the presence of pus was also noted.

RESULTS

Of the 40 patients under study, eight were female (average age 16) and 32 were male (average age 23). Each patient had one dressing applied, 10 dressings of each type were used.

Table 1 illustrates the adhesive properties found in the four different dressing types, and Table 2 shows the distribution of bleeding, subjective pain and infection.

Subjective pain was experienced in 32.5% of all patients, but was experienced more frequently in the adherent dressings group (22.5% as opposed to 10% experiencing pain in the non-adherent group).

Bleeding occurred in 20% of all dressings, the distribution being 15% in the adherent group and 5% in the non-adherent group.

Three patients had infected wounds as shown in the distribution in Table 2.

Table 1 Overall adhesion (and adhesion of individual dressing types)

Dressing		Adherent	Non-adherent
Code	Number		
A	10	5	5
B	10	7	3
C	10	6	4
D	10	1	9
Total no.	40	19 (47.5%)	21 (52.5%)

DISCUSSION

Dressing adherence may be defined in terms of comfort to the patient and in terms of trauma to the wound. On the parameters measured and under the trial conditions, an overall adherence rate approaching 50% was encountered.

Differences in adherence between the dressings were noted, A, B and C being similar in adhesion, while D demonstrated the least adherence (10%) and is the only dressing to cause neither bleeding nor subjective pain on removal.

Both subjective pain and bleeding occur more frequently in dressings which adhered to the wounds.

There is a small group of dressings (5% of the total number) which did not adhere (based on the criteria of this study) but bled on removal. The bleeding infers trauma to

Table 2 Distribution of bleeding, subjective pain and infection

Dressing			Bleeding				Subjective pain				Infection			
Code	No.		Adherent		Not adherent		Adherent		Not adherent		Adherent		Not adherent	
			Bleed	Not bleed	Bleed	Not bleed	Pain	No pain	Pain	No pain	Pus	No pus	Pus	No pus
A	10		0	5	0	5	4	1	1	4	0	0	0	1
B	10		6	1	2	1	5	2	2	1	0	0	0	0
C	10		0	6	0	4	0	6	1	3	0	1	0	1
D	10		0	1	0	9	0	1	0	9	0	0	0	0
Total	40		6	13	2	19	9	10	4	17	0	1	0	2
Per cent			15	32.5	5	47.5	22.5	25	10	42.5	0	2.5	0	5

the regenerating epithelium and, as such, should be considered as disadvantageous to the patient.

The points discussed in this study apply specifically to the wounds produced on removing toe nails. These points cannot be extrapolated to different types of wound, as the wound environments vary (for example, burns which produce copious exudate or open granulating wounds which may require many weeks for healing to become complete).

In conclusion, the importance of non-adherence of dressings to wounds has been stressed and it has been demonstrated that this property of non-adherence varies significantly between dressing types. It is recommended that from an adherence point of view the Silicon Polymer Foam is the most effective dressing for the wounds described. It is, however, the most expensive.

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