TO: PolyMem® Customers
FROM: Ferris Mfg. Corp. Management
RE: Article: English Translation of:

*The Effects of PolyMem® On The Wound Healing*
Kim YJ, Lee SW, Hong SH, Lee HK, Kim EK

Attached is an article that identifies substantial benefits of using PolyMem® versus petrolatum gauze. Both products were evaluated on patients with 2nd degree burns and those with split thickness skin grafts.

The article shows that PolyMem statistically:
1. Speeds Epithelialization (p<0.05)
2. Speeds Healing (p<0.01)
3. Reduces Wound Pain (p<0.01)
4. Increases Patient Comfort (p<0.01)

Additionally, in the discussion section, the authors point out that PolyMem is an ideal dressing because:

1. PolyMem can be used on infected wounds;
2. PolyMem is excellent for use on children to reduce wound pain and increase comfort;
3. PolyMem is very economical, even when compared to petrolatum gauze;
4. PolyMem reduces nursing time for dressing changes.

Please note: Figure 4 on page 6 is a picture of an injured hand. For clarity, the pictures are reproduced here with the discussed areas highlighted.

Fig. 4. Case 1. A 29-year-old patient had contact burn on the left palm. The PolyMem® was applied on the hypothenar area and vaseline gauze was applied on the thenar area.
(Left) 3 days after dressing.
(Right) 7 days after dressing.

Please follow PolyMem’s dressing change instructions for optimum product performance:

"DO NOT DISTURB THE WOUND BED. DO NOT CLEAN THE WOUND or flush with saline or water unless the wound is infected or contaminated. PolyMem dressings contain a wound cleanser and leave no residue. Additional cleaning of the wound may injure regenerating tissue and delay healing."

To request additional studies or for questions concerning PolyMem, please contact Ferris Mfg. Corp. at 1-800-POLYMEM (800-765-9636) or 630-887-9797.

Note: Ferris Mfg. Corp. did not solicit or fund this research.
THE EFFECTS OF PolyMem® ON THE WOUND HEALING

Yoong Jik Kim, M.D., Sun Woo Lee, M.D., Sung Hee Hong, M.D., Hyo Kyung Lee, M.D., Eun Kyung Kim, M.D.

Creation of the English translation was directed by the authors.

Little objective information is available on the influence of occlusive dressings on the healing of cutaneous partial skin defect wounds. Our purpose was to examine the effects of occlusive dressing by using the synthetic dressing material, PolyMem® in the management of 2nd degree burn wounds and donor sites of split thickness skin graft and partial-thickness wounds in rabbits. New Zealand white rabbits, 12 to 14 weeks of age, were divided into 2 groups. Two partial thickness skin wounds measuring approximately 40×30 mm were induced using a scalpel on the back of each anesthetized animal. They were designated as group I (dressing with PolyMem®, n=15), group II (dressing with conventional, n=15). Each treated wound was individually covered with the assigned dressing immediately after wounding. Wound were examined and measured at 10 days to determine the extent of healing. By day 10, the PolyMem® dressed wounds were approximately 67% healed while all vaseline gauze dressed wounds were about 50% healed. Standardized 20 mm full-thickness biopsy wounds were treated for 10 days. Section of PolyMem® group at POD 10 days showed complete epidermal regeneration above fibrotic dermis (H&E, x 40). Section of conventional group at POD 10 days showed marginal epidermal regeneration (H&E, x 40). 72 patients (44 patients with 2nd degree burn and 28 patients with skin graft donor sites) were divided into four groups. They were designated as group I (Burn patients with PolyMem®, n=24), group II (Burn patients with conventional methods, n=20), group III (T.S.G. patients with PolyMem®, n=14), group IV (S.T.S.G. patients with conventional methods, n=14). We investigated wound site pain, healing time, comfort and numbers of dressing change. As compared with the control group, the PolyMem® dressed group had less pain, more rapid healing time, more comfort, less frequent dressing changes. From these results, we concluded that the occlusive dressing with PolyMem® was an effective alternative to the conventional gauze dressing on the wound healing. Our results suggest that PolyMem® is one of the ideal dressing materials.

Key Words: PolyMem®, Wound healing, Dressing materials

From Plastic Surgery, Eulji General Hospital Clinical Pathology, Eulji General Hospital.

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I. Introduction

Partial thickness wounds such as 2nd degree burn wounds and donor sites of split thickness skin graft can be healed by the epithelization from the epithelial cells left in the skin parts such as sweat glands, sebaceous glands, and hair follicles. This process takes at least 1-2 weeks or more depending on the thickness of the defects, and patients also have pains and inconvenience until it is completely healed. In the treatment of partial wounds, various methods are used from the conventional dressing methods using gauze to the methods that use biological materials such as skins from cadavers, pig’s skin, and amnion, and to artificial synthetic materials. To establish an appropriate epithelization, the proper conditions should be made up.
that is, the moisture should be maintained, the pain should be minimal, and it should be easy to use without toxicity or allergies. We found out several advantages in treating burn wounds, donor sites of skin graft, wounds after decortications, abrasion, and bedsore by maintaining wound sites moist with the occlusive dressing using PolyMem®. One of the artificial synthetic materials to satisfy these conditions. We intended to find out the clinical usefulness of PolyMem® by investigating wound site pains and the comfort of patients, the number of dressings changed, and the healing time during the treatment through the clinical application of PolyMem®, and then by comparing to the conventional dressing method using vaseline gauze. Also, we intended to find out the effect of PolyMem® on the healing of wounds through the animal experiment using rabbits.

II. Materials and Methods

A. Animal experiments

1) Materials and methods

15 New Zealand white rabbits of 12-14 weeks of age that weighed 2,000-2,500 grams were used without sexual preferences. These rabbits were put in the wooden lattice and maintained under anesthetics with intravenous injection of 1.5 mg/kg of 5% pentobarbital sodium, and allowed to breathe room air voluntarily without intubation inside the trachea or oxygen supply. The abdominal area was shaved and all the hairs were completely removed by using hair-removing agent, and then sterilized the area to be operated with povidone and alcohol and performed the aseptic operation as possible. The dorsal area was divided into the left side and the right side, and created two 30 x 40 mm partial thickness skin defects separated by 3 cm using No. 15 scalpel. The rabbits were raised with the same conditions. We intended to see the cytotoxicity, acute systemic toxicity, dermal sensitization, primary skin irritation, and biocompatibility of a dressing.

The direction to use PolyMem® is as follows. The wound site is applied and finally, the dressing is changed by sight. Carr® proved the safety in the experimental research intended to see the cytotoxicity, acute systemic toxicity, dermal sensitization, primary skin irritation, and biocompatibility of a dressing. The direction to use PolyMem® is as follows. The wound site is cleaned with saline solution and wiped out with dry gauze, and then PolyMem® that is 0.5 inches wider than the wound area is applied and finally, the dressing is changed when it is 75% wet or the effusion leaks out near to the wound site. At this time, there is no need to apply topical treatment such as an ointment. PolyMem® has various types of design and it is well applied to topical wounds of any parts of the body because it is very lightweight and flexible. Also, the dressing method is easy, therefore, it can reduce not only the time used to change dressings but also the discomfort of patients. Because PolyMem® has 10 times of the absorbing power of its weight and it is non-adhesive, soft, and flexible, it can be applied to cavity wounds and fills necrotic cavities. Also, it cleans the wound site by absorbing excessive effusion, and promotes the formation of granulation tissues by producing moist environment. Particularly, in bedsores patients regardless of the depth of wounds, it has advantages that it can avoid excessive effusion that leaks out of the gauze when compared to a gauze dressing and that it can be used directly on infected wounds because of its antibacterial activity by containing bacteriostatic agent. In case of using gauze on burn wounds or partial thickness skin grafts donor sites, patients feel severe pain when changing dressing or when they are moving because the gauze sticks to the wound. Especially in case of child patients, this kind of pain causes too many difficulties for both patients and doctors. One of the biggest advantages of PolyMem® is that it does not cause pain when changing dressings because it contains glycerin as a moisturizer and prevents the dressing to stick to the surface of wounds. Also, it is considered that there is not any economical problem because the number of dressings is much smaller than that in the conventional groups, although the price of PolyMem® is rather expensive.

V. Conclusions

The comparison of the dressing method using PolyMem® and the conventional method using gauze in the partial thickness wounds such as 2nd degree burns and donor sites of skin grafts, was made in 72 patients visited the Plastic Surgery in this hospital from April 1, 1998 to December 30, 1998. Also, the animal experiment using rabbits was performed, and these two experiments led to the following conclusions.

1. In the animal experiments using rabbits, the result in the comparison of the grades of epithelization showed that the PolyMem® dressing groups had significantly more epithelization (p<0.05).

2. In tissue biopsy, PolyMem® groups formed basal layers from the marginal area of the wound from the 6th days of treatment and formed complete epidermal regeneration on the 10th days. While, the conventional treatment groups formed epidermal layers only in the marginal area of the wound at the 10th days of treatment and the complete epidermal layers covered the librocortic dermis on the 14th days.
as oxygen and carbon dioxide, so had a disadvantage of collecting excessive effusion. Varghese et al.7 and Chvapil et al.8 reported that a hydrocolloid dressing could absorb some of the effusion but had a limited control of excessive effusion. Ajly et al.9 reported that moist environment could promote wound healing but made the wound to be exposed more to infections by functioning as a medium for bacterial proliferation and fostering bacterial growth. On the other hand, it was reported that although moist environment could serve as a medium for bacterial proliferation and should produce moist environment by limited evaporation of moisture without collecting liquid between the dressing and the wound. Then, there should be a gas exchange of oxygen and carbon dioxide between wound surfaces and the air. Finally, the ideal dressing material should have characteristics such as adhesion, control of bacterial proliferation, prevention of the loss of water and electrolytes, esoteric natures, usefulness, safety, economy, staunching, and simple usage.

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### Table I. Grades of Epithelization in PolyMem® Groups and Conventional Groups in Rabbit Models at 10th Postoperative Days.

<table>
<thead>
<tr>
<th>Grade</th>
<th>PolyMem®</th>
<th>Conventional</th>
</tr>
</thead>
<tbody>
<tr>
<td>Excellent (75%-100%)</td>
<td>12</td>
<td>2</td>
</tr>
<tr>
<td>Good (50%-74%)</td>
<td>3</td>
<td>9</td>
</tr>
<tr>
<td>Fair (25%-49%)</td>
<td>0</td>
<td>4</td>
</tr>
<tr>
<td>Poor (0%-24%)</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Total (No.)</td>
<td>15</td>
<td>15</td>
</tr>
<tr>
<td>Average (%)</td>
<td>67</td>
<td>50</td>
</tr>
</tbody>
</table>

2) Evaluation
Both the experimental group and the control group received dressings on the 1st, 3rd, 6th, 10th, and 14th postoperative days. At the 10th days of the treatment, the condition of the wounds was measured by using plotting papers and the grades of epithelization were classified into 4 levels: 75%-100% of epithelization represents ‘excellent’, 50%-74% is ‘good’, 25%-49% is ‘fair’, and 0%-24% is ‘poor’. The comparison in the grades of epithelization between two groups were made by using one-way ANOVA (Analysis of Variance) with SPSS (Statistical Packages for Social Sciences) programs. Tissue biopsy of wounds and neighboring areas was performed in the experimental and the control groups using No. 15 scalpel on the 1st, 3rd, 6th, 10th, and 14th days of treatments, and then fixed in the 10% formalin solution and examined under the light microscope after stained with hematoxylin-eosin.

3) Clinical applications

1) Subjects
During the 9-month period from April 1, 1998 to December 30, 1998, 44 patients with the 2nd degree burn under 10% and 28 patients with split-thickness skin grafts were treated. The age was evenly distributed between 5-70 years and the average was 34 years, and divided into 4 groups as below:

<table>
<thead>
<tr>
<th>Grouping</th>
<th>Patient</th>
<th>Dressing Method</th>
<th>No. of Patients</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group I</td>
<td>Burn</td>
<td>PolyMem®</td>
<td>24</td>
</tr>
<tr>
<td>Group II</td>
<td>Burn</td>
<td>Conventional</td>
<td>20</td>
</tr>
<tr>
<td>Group III</td>
<td>S.T.S.G. PolyMem®</td>
<td>14</td>
<td></td>
</tr>
<tr>
<td>Group IV</td>
<td>S.T.S.G. Conventional</td>
<td>14</td>
<td></td>
</tr>
</tbody>
</table>

a. Group I (Burn patients with PolyMem®, n=24),
b. Group II (Burn patients with conventional method, n=20),
c. Group III (Split-thickness skin grafts patients with PolyMem®, n=14),
d. Group IV (Split-thickness skin grafts patients with conventional method, n=14).

Among burn patients, chemical burn patients were excluded in the experiment due to the uncertainty of the depth of wounds (Table II).

2) Methods
In the PolyMem® groups, the wound sites were washed with saline solution and blisterings were removed and wiped out with dry gauze. Then, PolyMem® was applied 1.5 cm wider than the wound site and 2-3 gauzes were applied on it to prevent the effusion to seep out and wet the area, and paper tapes or elastic bandages were applied to the area. If there was too much effusion and more than 80% of PolyMem® became wet, the wound site was washed again with saline solution and PolyMem® was changed with a new one, and maintained throughout the epithelization. In the conventional group with burn patients, the wound site was washed in the same way and covered with vaseline gauze, and then dressing with dry gauzes. The gauze was changed in 1-2 days to prevent it to become wet from the effusion and the treatment period was assumed until the vaseline gauze could be removed without bleeding after epithelization was completed.

In the treatment of donor sites of the patients with skin grafts operation, the wound site was starched by covering with wet gauze drenched with epinephrine that was diluted 1:100,000 in saline solution. Then, in PolyMem® group, the dressing was made in the same way as in burn patients. In the conventional group, the wound site was covered with vaseline gauze and the compression dressing was made with dry gauzes and elastic bandages and then, the wound site...
changes nor infections of wound sites in the experimental analyzed using one-way ANOVA. The healing time by the comfort during the treatment period was expressed as pain (2 points), and severe pain (3 points). The degree of evaluated as no pain (0 point), light pain (1 point), medium area of the wound site at 6 days after the operation, and the complete epidermal layers was formed at the 10th day. But, the conventional group showed that the epidermal layer was formed near the marginal area of the wound site at 10 days after the operation and the complete epidermal layers covered the fibrotic dermis at the 14th day (Fig. 3).

### III. Results

#### 3) Evaluation

The wound site pain and the degree of comfort were collected from the patients through the questionnaire, and the number of dressings changed and the healing time of individuals were investigated. The grades of pain in each patient during the change of dressings were divided and expressed as: no pain (0 point), light pain (1 point), medium pain (2 points), and severe pain (3 points). The degree of comfort during the treatment period was expressed as either comfort or discomfort.

The healing time by the epithelization was measured individually and compared and analyzed using one-way ANOVA.

### IV. Discussion

Several dressing methods for treating skin defects have been introduced. In biological materials, there are homograft (skins from cadavers, amni, etc.) and heterograft (skins from pigs and dogs, bovine amnia, etc.), but these have the limitations in clinical applications because they have antigenicity, and lack of esoteric and acceptant natures, and can not be used easily. Artificial synthetic materials are spray plastic, hydro, polyethylene, nylon, polyester (Dacron), rayon, and Opiste. Mixed dressing material is Biomade nanofibrous tissue that is combined with silicone membrane and then covered with refined collagen from pig's skin.

Thomas et al. and Ladun insisted that the followings should be met to get the best results. The patients' condition and the characteristics of wounds should be well known, and dressing materials should have the flexibility to fit all the applicable body parts and should be safe to use without pain, smell, toxicity, and allergy, and should promote wound healing without discomfort or inconvenience in daily activities. Also, it was reported that the ideal dressing was to make moist environment, which promoted the formation of the granulation tissues and the reepithelization and contributed to clean the wound site by dissolving necrotic tissues and then promoted the wound healing of partial thickness and full thickness skin defects.

One of various dressing materials recently introduced is OpSite, introduced in the early 1970, which is a semi-permeable, transparent, thin film. The advantages of this material are that it can maintain the wound site moist and promote the dissolution of necrotic tissues and the formation of granulation tissues, and further promote wound healing. But there are also disadvantages that too much effusion is collected around the wound site and makes the skin inflamed, and then it leaks out of the film so it has to be discharged with syringes or needles. Also, DuoDERM, one of the opaque and occlusive dressing materials, was introduced in the U.S.A. in 1982. This DuoDERM, a hydrocolloid dressing, was reported to promote the epithelization of the wound by reacting with the effusion from the wound and providing gel-like moist environment when applied to the wound site. However, this material, too, could not permeate vapors and gases such as...
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Several dressing materials have been introduced or have been utilized at the present time with the knowledge that dressing materials should equally be permeable to oxygen, water vapor, and vapor such as carbon dioxide. Also, dressing materials should be able to maintain wound site moist, flexible, and should be releasable for wounds of different sizes. However, it is known that there are many drawbacks to maintain the wound site moist, and dressing materials should be safe to use for the patients. Thus, Duoderm, a hydrocolloid dressing, was reported to promote the epithelization of the wound by reacting with the effusion from the wound and providing gel-like moist environment when applied to the wound site. However, this material, too, could not permeate vapors and gases such as oxygen, carbon dioxide, and water vapor. Therefore, it is not suitable for the wound which requires many dressing exchanges or the wound which requires large dressing exchange. These factors are, however, not included in future studies.
exposed to air. The author also insisted that an ideal dressing in which the moist condition was itself so it worked as physical barriers or physiological filters phagocytes and blood distribution in the granulation tissue medium for bacterial proliferation, there were plenty of functioning as a medium for bacterial proliferation and made the wound site to be exposed more to infections by waterproof to keep foreign substances or microbes from entering but to let vapors or oxygen permeate. Also, it should produce moisture by limited evaporation of moisture without collecting liquid between the dressing and the wound. Then, there should be a gas exchange of oxygen and carbon dioxide between wound surfaces and the air. Again, the ideal dressing material should have characteristics such as adhesion, control of bacterial proliferation, prevention of the loss of water and electrolytes, esoteric natures, usefulness, safety, economy, staunching, and simple usage.

Advantages of PolyMem

As oxygen and carbon dioxide, so had a disadvantage of collecting excessive effusion. Varghese et al.17 and Chvapil et al.18 reported that a hydrocolloid dressing could absorb some of the effusion but had a limit to control excessive effusion. Aly et al.19 reported that moist environment could promote wound healing but made the wound site to be exposed more to infections by functioning as a medium for bacterial proliferation and fostering bacterial growth. On the other hand, it was reported that although moist environment could serve as a medium for bacterial proliferation, there were plenty of phagocytes and blood distribution in the granulation tissue itself so it worked as physical barriers or physiological filters for bacterial invasion10,11.

Winter11 reported that the wound healing was twice faster in the occlusive dressing in which the moist condition was maintained than in the method in which the wound site was exposed to air. The author also insisted that an ideal dressing material should disperse and absorb the effusion and should be composed of a pad which could physically protect the wound and a microporous film which had micropores mimicked after some functions of epidermis that covered it. It was also reported that this ideal dressing material should satisfy the following conditions to help wound healing. That is, this microporous film should be waterproof to keep foreign substances or microbes from entering but to let vapors or oxygen permeate. Also, it should produce moisture by limited evaporation of moisture without collecting liquid between the dressing and the wound. Then, there should be a gas exchange of oxygen and carbon dioxide between wound surfaces and the air. Again, the ideal dressing material should have characteristics such as adhesion, control of bacterial proliferation, prevention of the loss of water and electrolytes, esoteric natures, usefulness, safety, economy, staunching, and simple usage.

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Table II. Summary of Patients

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2) Methods

In the PolyMem® groups, the wound sites were washed with saline solution and blisters were removed and wiped out with dry gauze. Then, PolyMem® was applied 1.5 cm wider than the wound site and 2-3 gauzes were applied on it to prevent the falling off of dressings from both of the two wounds on the dorsal area (Fig. 1).

B. Clinical applications

1) Subjects

During the 9-month period from April 1, 1998 to December 30, 1998, 44 patients with the 2nd degree burn under 10% and 28 patients with split-thickness skin grafts were treated. The age was evenly distributed between 5-70 years and the average was 34 years, and divided into 4 groups as below:

- Group I (Burn patients with PolyMem®, n=24),
- Group II (Burn patients with conventional method, n=20),
- Group III (Split-thickness skin grafts patients with PolyMem®, n=14),
- Group IV (Split-thickness skin grafts patients with conventional method, n=14).

Among burn patients, chemical burn patients were excluded in the experiment due to the uncertainty of the depth of wounds (Table II).

2) Evaluation

The comparison in the grades of epithelization between two groups were made by using one-way ANOVA (Analysis of Variance) with SPSS (Statistical Packages for Social Sciences) programs. Tissue biopsy of wounds and neighboring areas was performed in the experimental and the control groups using No 15 scalpel on the 1st, 3rd, 6th, 10th, and 14th days of treatments, and then fixed in the 10% formalin solution and examined under the light microscope after stained with hematoxylin-eosin.

A. Experimental rabbits

The body of a rabbit was lightly fixed with 1:100,000 in saline solution. Then, in PolyMem® group, the wound sites were washed again with wet gauze drenched with epinephrine that was diluted 1:100,000 in saline solution. After that, PolyMem® was changed with a new one, and maintained throughout the epithelization. In the conventional group with burn patients, the wound site was washed in the same way and covered with vaseline gauze, and then dressing with dry gauzes. The gauze was changed in 1-2 days to prevent it to become wet from the effusion and the treatment period was assumed until the vaseline gauze could be removed without bleeding after epithelization was completed.

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Of two wounds created on dorsum of a rabbit, the PolyMem® dressing was applied on the left side and the conventional dressing with vaseline gauze was applied on the right side. The size difference between PolyMem® applied wound and vaseline gauze applied wound appeared clearly on day 7 and 14. The PolyMem® applied wound showed faster healing than vaseline gauze applied wound. (Below, left) 7 days after operation. (Below, right) 14 days after operation.

F-68 surfactant functions as non-toxic cleanser and in the comparison of the grades of epithelization showed that it does not cause pain when changing dressings because it contains glycerin as a moisturizer and prevents the dressing to stick to the surface of wounds. Also, it has an ideal moisture vapor transmission rate and its transparent film makes it easier to know the dressing change time through the identification of dressing condition by sight.

Carr® proved the safety in the experimental research intended to see the cytotoxicity, acute systemic toxicity, dermal sensitization, primary skin irritation, and biocompatibility of a dressing.

The direction to use PolyMem® is as follows. The wound is washed with saline solution and wiped out with dry gauze, and then PolyMem® that is 1/4 inches wider than the wound area is applied and finally, the dressing is changed when it is 75% wet or the effusion leaks out near to the wound site. At this time, there is no need to apply topical treatment such as an ointment.

PolyMem® has various types of design and it is well applied to topical wounds of any parts of the body because it is very lightweight and flexible. Also, the dressing method is easy, therefore, it can reduce not only the time used to change dressings but also the discomfort of patients. Because PolyMem® has 10 times of the absorbing power of its weight, it is non-adhesive, soft, and flexible, it can be applied to cavity wounds and fills necrotic cavities. Also, it cleans the wound site by absorbing excessive effusion, and promotes the formation of granulation tissues by producing moist environment. Particularly, in bedsores patients regardless of the depth of wounds, it has advantages that it can avoid excessive effusion that leaks out of the gauze when compared to a gauze dressing and that it can be used directly on infected wounds because of its antibacterial activity by containing bacteriostatic agent. In case of using gauze on burn wounds or partial thickness skin grafts donor sites, patients feel severe pain when changing dressing or when they are moving because the gauze sticks to the wound. Especially in case of child patients, this kind of pain causes too many difficulties for both patients and doctors. One of the biggest advantages of PolyMem® is that it does not cause pain when changing dressings because it contains glycerin as a moisturizer and prevents the dressing to stick to the surface of wounds. Also, it is considered that there is not any economical problem because the number of dressings is much smaller than that in the conventional groups, although the price of PolyMem® is rather expensive.

V. Conclusions

The comparison of the dressing method using PolyMem® and the conventional method using gauze in the partial thickness wounds such as 2nd degree burns and donor sites of skin grafts, was made in 72 patients visited the Plastic Surgery in this hospital from April 1, 1998 to December 30, 1998. Also, the animal experiment using rabbits was performed, and these two experiments led to the following conclusions.

1. In the animal experiments using rabbits, the result in the comparison of the grades of epithelization showed that the PolyMem® dressing groups had significantly more epithelization ($p<0.05$).

2. In tissue biopsy, PolyMem® groups formed basal layers from the marginal area of the wound from the 6th days of treatment and formed complete epidermal regeneration on the 10th days. While, the conventional treatment groups formed epidermal layers only in the marginal area of the wound at the 10th days of treatment and the complete epidermal layers covered the fibrinous dermis on the 14th days.
3. In the clinical applications of PolyMem®, the wound site pain, the healing time, and the degree of comfort were compared. The results were that the PolyMem® dressing groups showed significant decreases in wound site pain (p < 0.01), in healing time (p < 0.01), and significant increases in the degree of comfort (p < 0.01).

4. In the various clinical areas of burns, skin grafts donor sites, and bedsores, PolyMem® is appropriate as an ideal dressing material and it can be useful in the clinical applications because it is also economical.

References


THE EFFECTS OF PolyMem® ON THE WOUND HEALING

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Creation of the English translation was directed by the authors.

Little objective information is available on the influence of occlusive dressings on the healing of cutaneous partial skin defect wounds. Our purpose was to examine the effects of occlusive dressing by using the synthetic dressing material, PolyMem® in the management of 2nd degree burn wounds and donor sites of split thickness skin graft and partial-thickness wounds in rabbits. New Zealand white rabbits, 12 to 14 weeks of age, were divided into 2 groups. Two partial thickness skin wounds measuring approximately 40x30 mm were induced using a scalpel on the back of each anesthetized animal. They were designated as group I (dressing with conventional method, n=15), group II (dressing with PolyMem®, n=15). Each treated wound was individually covered with the assigned dressing immediately after wounding. Wound was examined and measured at 10 days to determine the extent of healing. By day 10, the PolyMem® dressed wounds were approximately 67% healed while all vaseline gauze dressed wounds were about 50% healed. Standardized 20 mm full-thickness biopsy wounds were treated for 10 days. Section of PolyMem® group at POD 10 days showed complete epidermal regeneration above fibrotic dermis (H&E, x 40). Section of conventional group at POD 10 days showed marginal epidermal regeneration (H&E, x 40). 72 patients (44 patients with 2nd degree burn and 28 patients with skin graft donor sites) were divided into four groups. They were designated as group I (Burn patients with PolyMem®, n=24), group II (Burn patients with conventional methods, n=20), group III (S.T.S.G. patients with PolyMem®, n=14), group IV (S.T.S.G. patients with conventional methods, n=14). We investigated wound site pain, healing time, comfort and numbers of dressing change. As compared with the control group, the PolyMem® dressed group had less pain, more rapid healing time, more comfort, less frequent dressing changes. From these results, we concluded that the occlusive dressing with PolyMem® was an effective alternative to the conventional gauze dressing on the wound healing. Our results suggest that PolyMem® is one of the ideal dressing materials.

Key Words: PolyMem®, Wound healing, Dressing materials


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1. Introduction

Partial thickness wounds such as 2nd degree burn wounds and donor sites of split thickness skin graft can be healed by the epithelization from the epithelial cells left in the skin parts such as sweat glands, sebaceous glands, and hair follicles. This process takes at least 1-2 weeks or more depending on the thickness of the defects, and patients also have pains and inconvenience until it is completely healed. In the treatment of partial wounds, various methods are used from the conventional dressing methods using gauze to the methods that use biological materials such as skins from cadavers, pig’s skin, and amniotic, and to artificial synthetic materials. To establish an appropriate epithelization, the proper conditions should be made up.