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Fixing hair using a hair-fixing sheet: better than hairpins?

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Identifying tumors or wounds on the scalp is difficult because hair blocks the vision during surgery and suturing. In the meantime, we have commonly used hairpins to hold the hair for a clearer view; however, we would like to suggest a new method, a "hair-fixing sheet," consisting of hook-like surface. We applied the two methods, hair-fixing sheets and hairpins, assuming several situations. In these situations, it was possible to fix a wider range or various shapes more conveniently using a hair-fixing sheet than using several hairpins at a similarly low cost. In addition, it was easy to change the hair to be fixed, remove it postoperatively, and prevent the hair from being pulled out, thereby preventing additional postoperative pain.

Keywords: Hair / Alopecia / Scalp

Idea and Innovation

INTRODUCTION

Typically, numerous surgeries and procedures are performed using scalp incisions. Identifying small tumors or tiny wounds on the scalp is difficult because hair obstructs vision, regardless of the use of general or local anesthesia. When suturing the scalp, it is often difficult to check scalp layers and confirm the location of the suture materials. Hairpins are commonly used for this purpose. A hairpin has the advantages of being small, easy to carry, and has good fixing power. Furthermore, these materials are inexpensive. However, we propose a different approach: a "Hair-fixing sheet." This study aimed to confirm the usefulness of hair-fixing sheets by comparing cases in which hair-fixing sheets and hairpins were used.

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IDEA

Hook-and-loop interaction, also commonly known by the famous trade name Velcro, is widely used for adhering clothes, bags and shoes, and consists of two thin plastic sheet strips. One is covered with tiny flexible hooks and the other is covered with tiny loops. Although the hook-and-loop arrangement does not completely adhere the two different parts, they can adhere to the appropriate strength and are easy to attach and detach without scratching the objects. The hook-and-loop interaction is based on the characteristics of plants that easily stick to animal fur, in which hook-like surfaces cling to anything soft or tangled such as animal hair, forming a reversible attachment. A hair-fixing sheet with tiny hooks was developed using these properties and is used by many people for styling their hair; we applied this item to surgery (Fig. 1).

For appropriate applications, the direction of the hair to be fixed was clearly determined, the same as if fixing it with hairpins, and a hair-fixing sheet of the required length was attached and pressed lightly. The hair was naturally stuck in the hooks. The hair around the operation site and under the sheet was held together by light pressure, preventing the hair from float-

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ing. Hair-fixing sheets and hairpins were applied in the following four situations.

First, during the process of fixing the hair after finishing the drape: because the hair-fixing sheet is longer than a hairpin, a wider range could be fixed at once with fewer sheets; whereas numerous hairpins are required to cover large areas (Fig. 2). With a heart-shaped sheet, even a narrow space could be made visible. In addition, if a hair-fixing sheet is cut to an appropriate size and a hole is made, it can be used as a hole towel to fix the hair. Second, when additional hair fixation is required for rotation flap surgery or to change the position of the fixed hairpin during surgery: the position of the fixed hair could be changed conveniently to check another point, because the hair to be fixed could be easily changed without damaging the hair already fixed. Removing a fixed hairpin may be difficult, as it tangles with hair, causing pain by pulling and detaching, and may have to be redraped because of contamination by infected hair. In addition, this method is convenient because no additional sterilized sheet is required to fix the additional area. Third, at the moment of unfixing the hair after surgery: if a dark-colored hairpin is used, the hair is covered, and if a light color is used, it is difficult to distinguish from the scalp. Furthermore, hairpins are challenging to remove because the hair is caught during removal, causing pain or not being found. The hair-fixing sheet was easy to remove after surgery because the color scheme was clearly visible without being hidden by skin or hair. Moreover, if bleeding occurs, it can

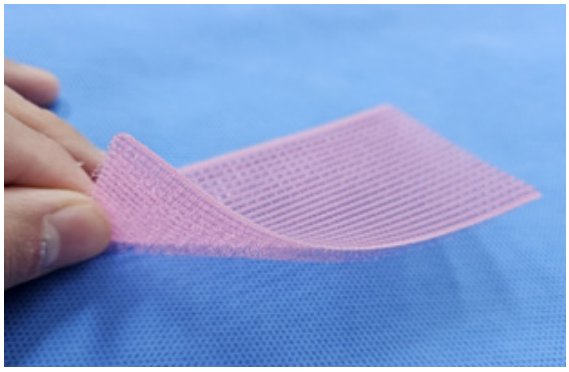

Fig. 1. Hair-fixing sheet with tiny hooks.

Fig. 2. Example of fixing hair with sheets (A) and hairpins (B).

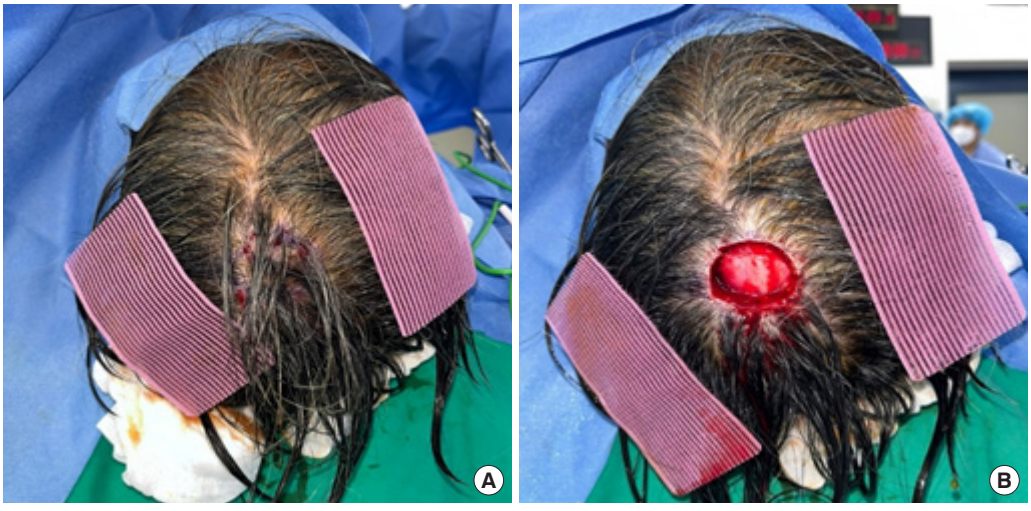

Fig. 3. Example of fixing hair with sheets before operation (A) and after irrigation (B).

be identified without obscuring or discoloring the field of vision, because the sheet does not blend in with the hair. Fourth, after irrigation: irrigation causes hairpins to be pushed by the irrigation liquid, unfasten from the hair, and separate from the scalp. However, the hair-fixing sheet had multiple folds of fixation between the hair and tiny hooks: therefore, it held the hair with almost no change in position even after irrigation (Fig. 3).

Consequently, hair-fixing sheets can fix a wider range of shapes more conveniently than several hairpins at a similarly low cost. In addition, the fixed hair can be changed easily, the sheet is easy to remove, and prevents additional pulling and pain. Therefore, the use of hair-fixing sheets would be beneficial for both surgeons and patients.

DISCUSSION

A hair-fixing sheet has approximately 100 hooks per square centimeter. If it had hooks in one direction, it would have easily detached from the hair during irrigation: however, because it had hooks in multiple directions, it was designed to prevent hair from easily falling out once caught. Despite these features, if the number of hairs caught in the hooks is insufficient, the hair-fixing sheets can easily detach.

Herein, we emphasize the advantages of hair-fixing sheets compared with hairpins. Although hair-fixing sheets have several advantages over hairpins, they also have three disadvantages. First, a hair-fixing sheet cannot achieve a strong fixation. The position of the hair-fixing sheets can be easily changed because they are easy to attach and detach; however, the adhesion of the hair-fixing sheet to hair is weaker than that of the hairpin. The hair did not completely adhere to the scalp during fixation and floated more than when a hairpin was used. Second, it is too large to fix in a narrow area, such as a hole in a towel. The use of a towel with a small hole may be limited because the hair-fixing sheet is generally larger than the hole. Therefore a hair-fixing sheet must be attached before draping. In such cases, the advantage of being easy to attach and detach compared with a hairpin and easily changing the position disappears. Third, it is not easy to attach to a curved surface. Because hairpins are hard and curved, hair can be fixed regardless of the shape of the head; however, hair-fixing sheets are not hard enough to fix hair onto a curved surface. It adheres well to hair, but may cause hair to float on curved surfaces.

These shortcomings mentioned above need to be improved through further research. In addition, the color selection of the hair-fixing sheet must be considered. In general, when there is a contrast between two colors, it is visually perceived as more intense. For example, in the case of blonde hair, a sheet in the purple series with a complementary color relationship should be chosen to determine whether the hair is missing. Considering the color of blood, we can check for bleeding by selecting a sheet in the green series, which is also a complementary color. Alternatively, a sheet in the blue series could be selected to relax the mood of operator. Additional research on better sheet colors for surgery using hair-fixing sheets is required.

NOTES

Conflict of interest

No potential conflict of interest relevant to this article was reported.

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Ethical approval

The study was approved by the Institutional Review Board of Wonkwang University Hospital (IRB No. WKUH 2023-08-012).

Patient consent

The patients provided written informed consent for the publication and use of their images.

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