RESEARCH ARTICLE

A Randomized Controlled Trial to Compare the Conformability and Adhesion of Fiberglass Splint Over Plaster of Paris Splint Material in Rhinoplasty

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Abstract

Aim/background: In rhinoplasties, splints are frequently employed to stabilize the nasal bone structure after osteotomies. The most popular splinting techniques used are Plaster of Paris (POP), thermoplastic splints, and aluminum splints. These splints also help to approximate the skin flap to the underlying bone and reduce hematoma formation. The objective of our study is to assess and compare the conformability and adhesion properties of fiberglass splints vs POP splint materials in the context of rhinoplasty.

Materials and methods: About 1,000 patients undergoing cosmetic rhinoplasty were randomized into two groups. Group I, POP splint was placed, and group II patients managed fiberglass thermoplastic material.

Conclusion: Fiberglass splint material is far simpler to use, more beneficial and takes lesser time to prepare overall than the widely used POP splinting material.

Clinical significance: Due to the benefits of fiberglass splint material, the surgeon may be able to avoid long recovery times and obtain the ideal postoperative look.

Keywords: Fiberglass, Nasal splints, Plaster of Paris, Rhinoplasty.

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Introduction

In cosmetic surgery, rhinoplasty is a frequent technique. For this surgery, it is important to have a solid understanding of nasal anatomy, accurate facial analysis, method selection, and ethnic variances.[1] The combination of the aforementioned elements makes rhinoplasty a challenging and contentious treatment.[2]

Conserving native anatomy with cartilage has been more popular over the past 20 years as opposed to ablative procedures that involve reducing or dividing the osseocartilaginous structure.[3] To repair contour abnormalities and reestablish structural support, sparing suture methods and augmentation of deficient regions are used.[4]

After rhinoplasties, external nasal splints are frequently utilized to stabilize the bony nasal structure.[5] Nasal splints are used to stabilize the nasal skeleton, approximation of the skin flap to the bone beneath, avoid hematoma development, and manage edema.[6]

The external nasal splint serves a variety of purposes and is regarded as an essential part of postoperative care for rhinoplasty. Maintaining the repaired anatomy in the desired position with the proper stability and immobilization is crucial during the healing process. This makes it possible to keep the intended outcome and more easily regulate the ideal nose shape. The term "orthorhinotics" refers to a technique that some writers have employed in the past that effectively alters the form of the nose by using external nasal splints and taping methods.[7]

In modern rhinoplasty practices, a common approach employed by surgeons involves the application of tape and a pliable splint immediately post-surgery. The commencement of rhinoplasty surgery entails creating incisions to permit the underlying cartilages and bone to be accessed. Subsequent steps typically include undermining the epidermis, reshaping the cartilage structure, and executing controlled fractures with subsequent realignment of the nasal bones. Post-treatment, the application of supporting tape and a sturdy splint becomes imperative to ensure the proper re-draping of nasal skin and the precise positioning of nasal bones. It is worth noting that after a technically proficient surgery, the improper use of tape and inadequate immobilization of the treated nose may compromise what would otherwise be a successful outcome.[8] The primary objective of our study is to compare the conformability and adhesion characteristics of fiberglass splints in contrast to Plaster of Paris (POP) splint material in the context of rhinoplasty.

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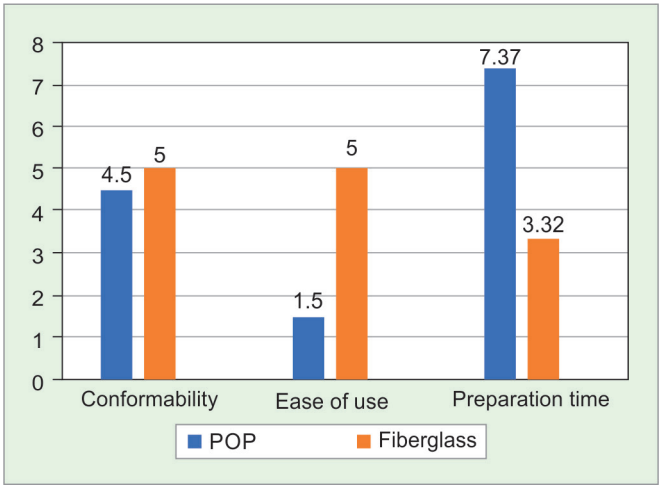

Fig. 1: Comparison of conformability, ease of use (measured with 5-point scale where 5 is most easy) and total preparation time between Plaster of Paris splint (POP) and fiberglass splint material (mean ± SD)

Fig. 2: As soon as the fiberglass splint material is submerged in room temperature water, it becomes stiff. Total preparation time is greatly decreased because warm water is not needed

Materials and Methods

Patients undergoing rhinoplasty were the subjects of a prospective, randomized controlled study. The same surgeon and assistant conducted open structure rhinoplasty on all of the patients along with lateral osteotomies. Following the surgery, the nose was covered with adhesive tape and a nasal cast was then put on. The patients were randomized into two groups. Group I, POP splint was placed and group II patients managed fiberglass thermoplastic material.

The primary author collected three sets of data during the intraoperative process: (1) ease of use (rated on a 5-point scale from 1 to 5 representing how easy); (2) conformability (rated on a 5-point scale from 5 to 5 representing how conformable); and (3) adhesion (rated on a 3-point scale from 3 to 5 representing how adhesive).

Following surgery, all patients were evaluated on days 1, 3, 9, and 21. The patient rated the comfort of the cast on the ninth postoperative day. All of the casts were taken off on the ninth postoperative day. Throughout the investigation, no problems were noted.

Results

The study sample included 1,000 (500 in each group) patients. The POP splint had a mean conformability score of 4.5. The fiberglass thermoplastic material's mean conformability score was 5.0. The difference was found to be 0.5. Plaster of Paris splint adhesion had a mean score of 2.15 and that of fiberglass thermoplastic material was 2.5. The difference was found to be 0.35. Patient acceptability was good or excellent in both the groups.

The mean ± SD score for ease of use for POP splint was 1.5 ± 0.54. The mean ± SD score for ease of use of fiberglass thermoplastic material was 5.0 ± 0.0. The difference was found to be 3.5.

The mean total preparation time for POP splint material was 7 minutes 37 seconds. The mean total preparation time for fiberglass splint was 3 minutes 32 seconds. The difference was found to be 4 minutes 55 seconds. Comparison of conformability, ease of use and total preparation time between POP splint and fiberglass splint material (mean ± SD) is shown in Figure 1.

Discussion

After rhinoplasty nasal splinting is performed to stabilize the nasal structure. POP, aluminum, and heat-malleable plastic splints are typical materials. POP external dressings are frequently used because they are affordable, accessible, and simple to apply.[9]

After rhinoplasty, self-adhesive metal splinting has been utilized for many years. The metal splint is pliable enough to be trimmed and folded snugly around the nasal bridge while being solid enough to offer support.[9]

The skin is well-insulated and protected by the two layers of rubber dressing. There have not been any side effects specifically associated with using this dressing and splint. Self-padded aluminum splints are hard yet delicate bandage that is generally unnoticeable and well-tolerated by patients. It is available in skin-colored camouflage, which is applied over clothing in that hue rather than white.[8,9]

Thermoplastic resins, dental compounds, metal splints, and tape without a splint were among the other many nasal splinting techniques that Webster and associates experimented with.[10] They expressed dissatisfaction with each of them and encouraged the usage of POP. The final cast was constructed from two different parts, each of which required several folds and movements. Goldman recommended using a metal clamp that was secured by a triangular headband. This somewhat a bulky device with two metal plates that applied constant medial pressure on the nasal bones by turning a screw.

There are numerous problems with the nasal splints that are now available. For the malleable materials, the casting material preparation in warm or hot water requires more time. Because an assistant must leave the operating theater to boil the water before returning to the procedure, the installation of the cast is often delayed, potentially resulting in soft tissue swelling over the dorsum. Under the cast and tape, an accumulation of edema could impede healing and alter the surgical result.[6,11,12]

As soon as the fiberglass splint material is submerged in room temperature water, it becomes stiff. The total preparation time is greatly decreased because warm water is not needed (Fig. 2). The fiberglass splint material is put on the nose and immediately becomes stiff after being submerged in room temperature water

Fig. 3: The fiberglass splint material is put on the nose and immediately becomes stiff after being submerged in room temperature water

Fig. 4: Nasal casting is a good use for fiberglass splint material since it exhibits strength, malleability, conformability, and quickness in reaching stiffness

(Fig. 3). Nasal casting is a good use for fiberglass splint material since it exhibits strength, malleability, conformability, and quickness in reaching stiffness (Fig. 4).

Orthopedic injuries have been successfully and commonly treated with fiberglass splint material. The cast hardens fast in the water of any temperature thanks to the polyurethane resin impregnated into the knitted fiberglass cloth, which also offers strength and conformability. The material is easy to wear and can be readily molded to fit any nose.

Conclusion

The findings suggest that fiberglass splint material is far simpler to use and takes less time to prepare overall than the widely used POP splinting material within the constraints of the study methodology.

Clinical Significance

Due to the benefits of fiberglass splint material, the surgeon may be able to avoid long recovery times and obtain the ideal postoperative look. It was found that POP was a heavy, bulky dressing that takes some time to become firm.

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