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## Gravity position to prevent facial edema in hair transplantation

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One of the most disfiguring but temporary complications after hair transplantation is facial swelling. Many useful preventive methods against swelling have been tested. One unanimously agreed upon prevention to facial swelling is steroid use. There are also other practical physical methods—sleeping or resting with the head elevated at a 45-degree angle using pillows; wearing a firm headband; applying adhesive tape below the hairline; and applying ice packs to the forehead—that are recommended to reduce edema. However, despite the best efforts, edema can still be a problem. For example, this author met some patients who had severe upper eyelid swelling even though they used steroids and spent much time with their heads elevated. Interestingly, some were dentists. Because dentists spend much of their day with their heads inclined downwards, it seems that the lymphatic fluid accumulates in the frontal scalp, forehead, and upper eyelids due to gravity. Therefore, this author studied new positions using gravity as a preventive method against facial swelling after hair transplantation.

### Objective

The purpose of this study was to evaluate whether keeping a supine, lateral decubitus posture and/or leaning the head backwards (to the point where the face is parallel to the floor, looking straight up at the ceiling) for 1.5 days whenever possible after surgery is effective in the prevention of facial edema.

### Material and Methods

One thousand two hundred (1,200) patients with male or female pattern hair loss undergoing hair transplantation participated in this study from January 2004 to October 2008. All patients took steroid supplements for 4 days (betamethasone im—1 mg/10kg body weight for 2 days, then oral prednisolone [20mg/day] for 2 days), Tylenol® as a pain killer for 4 days, and prophylactic antibiotics for 7 days.

Patients were instructed to keep a supine or lateral decubitus position or to lean the head backwards (to the point where the face is parallel to the floor, looking straight up at the ceiling) as much as possible for 1.5 days after surgery (Figure 1). Normal activities such as eating, going to the bathroom, and visiting the clinic for shampoo treatment were permitted.

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Figure 1. Gravity position: keeping supine or lateral decubitus position, not in prone position.

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**Gravity position**

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The severity of swelling was evaluated daily from the day following surgery to day 7. The resulting edema was classified into four categories according to the following severity scale:

- Grade 0:** No swelling or swelling extending to 1cm under the anterior hairline
- Grade I:** Swelling extending to the mid-forehead
- Grade II:** Swelling extending to the lower forehead
- Grade III:** Swelling extending to the upper eyelid or eyelid bruising

The compliance of patients during the 1.5-day period was evaluated as follows:

- Good:** Remained in a supine, lateral decubitus posture and/or leaned backwards without head elevated more than 75% of the 1.5-day period
- Average:** Remained in a supine, lateral decubitus position and/or leaned backwards without head elevated between 50% and 75% of the 1.5-day period
- Poor:** Remained in the supine or lateral decubitus position and/or leaned backwards without head elevated less than 50% of the 1.5-day period

**Results**

The following are the results of the 1,200 participants in this study:

**Severity of Edema**

(Grade / Number of participants / Percentage)

- Grade 0:** 1,134 (94.5%)
- Grade I:** 55 (4.6%)
- Grade II:** 8 (0.7%)
- Grade III:** 3 (0.2%)

**Patients' Compliance**

(Level of Compliance / Number of participants / Percentage)

- Good:** 968 (80.7%)
- Average:** 190 (15.8%)
- Poor:** 42 (3.5%)

Most of the Good compliance group showed Grade 0. Those who developed Grade III edema were in the Poor compliance group. Therefore, these findings strongly support that the position of the head during the 1.5 days after surgery is very important to the prevention of facial swelling.

**Discussion**

Facial edema, or swelling, caused by the retention of normal amounts of tissue and fluid after hair transplantation

begins on the second postoperative day, usually reaching a peak on the fourth postoperative day, and has usually resolved completely by the sixth or seventh postoperative day.<sup>1</sup> It inhibits patients returning to society or the workplace quickly, and they have to incur the expense of longer leaves or holidays. Neighbors can notice the patient received hair surgery. So prevention of edema is very important to both patients and doctors.

Perioperative and postoperative steroids have been found to reduce the incidence and degree of postoperative edema after head and neck surgery.<sup>2-4</sup> Dr. Norwood claims to have reduced his incidence of postoperative swelling from 20% to less than 5% by using systemic corticosteroids and adding 50mg of triamcinolone acetonide to 50 mL of lidocaine (1 mg/mL) for operative anesthesia.<sup>5</sup> However, even with the use of cortisone doses at the upper limits, there is often some minor swelling and rarely there is considerable swelling. There are also complications after steroid use. Dr. Arnold reported the occurrence of a folliculitis-like reaction that occurred at injection sites after the addition of triamcinolone acetonide to lidocaine.<sup>6</sup> Other inevitable limitations to steroid use include that many athletes cannot take steroids because of drug screening. We must also be careful administering steroids for immunocompromised patients such as those with diabetes mellitus.

Therefore, other methods are necessary. Besides steroids, postoperative edema can also be reduced through physical methods such as the use of a turban-style wrap, compression tape below the hairline, an ice pack, and leaning the head back to a 45-degree elevation.<sup>7</sup> It is known that elevation reduces venous and lymphatic pressure and is, therefore, advantageous. Most surgeons recommend that the patient elevate the upper body to at least 45 degrees for the first 24 hours after the transplant. Unfortunately, there is no way of predicting which patients will experience edema or the degree of swelling. Once edema has begun, steroid, ice packs, and other physical methods have little effect. Therefore, prevention is the best treatment.

I personally met several dentists who experienced severe forehead and upper eyelid swelling after hair transplantation even though they made use of steroids and various physical methods. They all had one thing in common: They inclined their heads while they worked. It seems that lymphatic fluid accumulates in the frontal scalp, forehead, and upper eyelids due to the same reason an apple falls to the ground: GRAVITY. Therefore, I designed this study to evaluate whether the head position had an effect on the prevention of facial swelling. Patients were instructed to keep a supine or lateral decubitus position or to lean their head backwards to the point where the head was parallel to the ground, looking straight up at the ceiling whenever possible for 1.5 days after surgery.

This is in contrast to the normal 45-degree elevation of the head. I will henceforth refer to this ideal position, with the face parallel to the floor and ceiling, as the "gravity position." Normal activities

**Table 1. Comparison of Severity of Facial Edema According to the Patient's Compliance**

Patient's Compliance	Severity of Edema (Number of Patients [%])				Total
	Grade 0	Grade I	Grade II	Grade III	
Good	940 (97.1)	28 (2.9)	—	—	968 (80.7)
Average	176 (92.6)	13 (6.9)	1 (0.5)	—	190 (15.8)
Poor	18 (42.9)	14 (33.3)	7 (16.7)	3 (7.1)	42 (3.5)
Total	1,134 (94.5)	55 (4.6)	8 (0.7)	3 (0.2)	1,200 (100)

## Gravity position

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such as eating, going to the bathroom, and visiting the clinic for shampoo treatments were permitted. Because it moves very slowly, it takes at least 1 or 2 days for the lymphatic fluid to move from the frontal scalp to the mid-forehead. I designed this gravity position to be practiced for only 1.5 days so the lymphatic fluid could accumulate in the crown or parietal scalp. Then from the second postoperative day, normal activities were permitted, including sitting with the head elevated, but with the exception of lying in a prone position; thus using gravity to move lymphatic fluid well to the lower occipital scalp.

Of the 1,200 patients, 80.7% fell into the category of Good compliance, 15.8% Average, and 3.5% Poor. So, because the compliance was excellent, it seems to follow that it is not difficult to remain comfortably in the gravity position. According to the results, the Good compliance group showed minimal or no swelling, but a quarter of the Poor compliance group showed severe forehead and upper eyelid swelling. Therefore, it seems that this "gravity position" diverts lymphatic flow from the transplanted area toward the occipital or temporo-parietal scalp and results in less or no swelling in the forehead or upper eyelids.

There may be some controversy regarding what is the ideal position to prevent facial edema: traditional head elevation at a 45-degree angle or this author's gravity position. It has been known that traditional head elevation at a 45-degree angle has an effect on the prevention of facial edema. Dr. Abbasi also reported Grade II postoperative edema in 86% of patients who slept at a 45-degree angle without steroid use and Grade III postoperative edema in 86% of patients who spent much time in a vertical position without steroid use.<sup>8</sup> So, it can be concluded that head elevation at a 45-degree angle can make lymphatic fluid move to forehead due to gravity.

The relationship between shingle point and anterior hairline is important to consider. If the anterior hairline is much superior to the shingle point (Figure 2), head elevation at a slight degree cannot cause lymphatic fluid to move to the forehead. However, if the anterior hairline is inferior to the shingle point or around the shingle point (Figure 3), a slight head elevation or 45-degree angle may still greatly allow the lymphatic fluid's movement to the forehead due to gravity, resulting in forehead swelling.

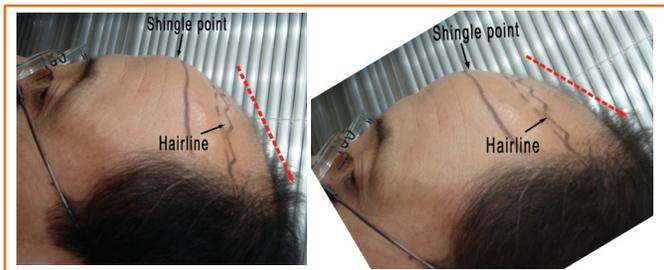


Figure 2. If the anterior hairline is much superior to the shingle point, head elevation at a slight degree cannot cause lymphatic fluid to move to the forehead. The red arrow indicates the movement of lymphatic fluid.

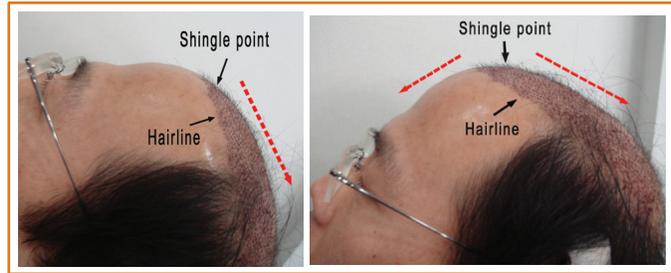


Figure 3. If the anterior hairline is inferior to the shingle point or around the shingle point, slight head elevation can allow the lymphatic fluid's movement to the forehead due to gravity. The red arrow indicates the movement of lymphatic fluid.

## Conclusion

The traditional steroid use and other physical methods were known to be effective in the prevention of postoperative edema. But this author's gravity position—keeping a supine or lateral decubitus position or leaning the head backward to a level parallel to the floor whenever possible for the first 1.5 days after surgery—is also an excellent method to prevent forehead edema after hair transplantation.

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