

# A new preservation technique for dehumping the dorsum

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**Abstract. – OBJECTIVE:** We aimed to offer a new preservation strategy for dehumping the dorsum by using a variation of the cartilage push-down (Ishida) technique.

**PATIENTS AND METHODS:** Three hundred patients (42 males and 258 females) had surgical procedures. All procedures were closed-surgery-type, primary-case procedures performed through a closed incision. Low cartilaginous septal strip resection was performed on 269 individuals, whereas high septal strip resection was performed on the remaining 31 patients. The bony cap is shielded as a separate unit and preserved, so protected from any potential damage. The cartilage roof is separated from the bone roof and lowered while wearing the bony cap component. As a result, less concealment is required. However, it is ineffective on dorsal profiles that are sharp or S-shaped, as opposed to flat. Thus, the modified cartilage push-down with bony cap rasping procedure can be carried out. The sharp hump on the bony crown of the skull is smoothed out and filled. Therefore, the bony cap above the central cartilage roof is much thinner. Because the hump is less likely to appear again, concealment is unnecessary. A median of 8.5 months was spent following-up (6-14 months).

**RESULTS:** According to our method, among men (n=42), the hump size ranged from minor (n=5) to medium (n=25) to big (n=12). There were 258 women, 88 of whom had a little hump, 160 had a medium hump, and 10 had a huge hump. Indicative of surgeon satisfaction with low cartilaginous septal strip excision vs. high septal strip resection include the following: with a total of 269 patients, 35 males, and 234 females had low cartilaginous septal strip resections, with 98 and 96% success rates, respectively, for the surgeons. There were 31 patients, seven men and 24 women, who all underwent high septal strip resections, with a 98% and 96% success rate for the surgeons. It was found that there was a correlation between the size of the hump and the

level of satisfaction felt by its bearers. Rates of male satisfaction with humps ranged from 100% for little humps to 100% for medium humps to 99% for huge humps. Satisfaction percentages among women ranged from 98% in the case of little humps to 96% among medium humps and 95% among large humps.

**CONCLUSIONS:** Our technique of modification of the cartilage push-down (Ishida)1 method is applied for dehumping the dorsum. High satisfaction percentages were obtained from the patients and surgeons. This technique may be a good option for patients who need dehumping.

*Key Words:*

Cartilage push-down with bony cap, Preservation method, Rhinoplasty.

## Introduction

The nasal hump is a one-of-a-kind structure made up of bone and cartilage. The upper lateral cartilages (ULCs) and the posterior septal cartilage are joined in the midline to create an M-shaped primary structure called the nasal septum cartilage<sup>1-8</sup>. The internal valve is released by a spring housed in this mechanism. During the fourth month of pregnancy, the ULCs have been demonstrated<sup>9</sup> to fuse with the septal cartilage.

Ishida et al<sup>10</sup> offer a cartilaginous push-down technique to cure big, deviated, and severely inclined humps. As part of the hump treatment, the septal deviation is also addressed. A cartilaginous push-down with a high cartilaginous septal strip is offered, similar to the spare roof technique by Ferreira et al<sup>11</sup>. In both procedures, the bony hump was removed, leaving a rough spot where cartilage had previously been. In the highest third of the nose, right above the keystone, some anomalies are visible, like a little open roof.

Partial excision of the nose's bones and cartilage is the foundation of the traditional method of nasal hump reduction, which was first described by Joseph<sup>12</sup>. The two ULCs and the septal cartilage constitute the cartilaginous part of the hump as a single entity. Unique to the human body, the cephalic regions of these three structures combine to produce a shape that resembles the letter "M"<sup>9</sup>. Long-term abnormalities, shadows, and pinching may be traced back to the resection of this structure into three parts during hump reduction in conventional rhinoplasty. Additionally, the septal cartilage's angle and relationship to the ULCs are diminished, which may impair the internal nasal valve's ability to do its job<sup>1</sup>.

Preservation includes the three components of rhinoplasty which are: (1) raising the skin sleeve in the subperichondrial-subperiosteal plane, (2) protecting the osseocartilaginous dorsum, and (3) minimizing the amount of cartilage removed from the alar cartilages to create the appropriate form using sutures. It is important to remember that the word "dorsal preservation" (PR) is only one of three components of PR and that the two concepts are not synonymous<sup>13</sup>.

This work introduced a novel preservation method for dehumping the dorsum based on a variant of the cartilage push-down (Ishida) procedure<sup>1</sup>.

## Patients and Methods

Following the Declaration of Helsinki guidelines, this retrospective study was carried out in the ENT Department at Eskişehir Osmangazi University's Faculty of Medicine. Institutional Review Board permission was obtained by Bilecik Seyh Edebali University's Non-invasive Clinical Researches Ethics Committee (Date: 07.02.2023, Number: 3).

### Patients

During the years 2019, and 2022, a total of 300 individuals underwent surgery at Vadi Liv Hospital, and Atakent Taksim Acibadem Hospital by the first author (EA). There were 42 males and 258 females, ranging between 17 and 55 of age (median age 27.6 years). All procedures were endonasal-surgery-type, primary-case procedures performed through a closed incision. Ninety-three individuals were categorized as having little nasal humps, 185 as having medium humps, and 22 as having big humps.

Nasal deviation was seen in 269 cases. Out of the total number of patients, 269 had low cartilaginous septal strip excision, while the remaining 31 had high septal strip resection. Over 285 patients had lateral osteotomies done ([Supplementary Figures 1A-G, 2A-G, 3A-G](#)). A median of 8.5 months was spent following-up (6-14 months).

### Modification of the Cartilage Push-down (Ishida) Method'

The bony cap is removed in a "traditional cartilage push-down with bony cap removal rhinoplasty"<sup>17</sup>, and the cartilage roof is preserved by being pressed into the bone roof<sup>10</sup>. Therefore, it is optional to replace the roof's center section. However, since the bony cap has been removed, some concealment on the central roof may be in order.

In the "cartilage push-down technique with bony cap preservation", the cartilage roof is separated from the bone roof and lowered while wearing the bony cap component. As a result, less concealment is required. However, it is ineffective on dorsal profiles that are sharp or S-shaped, as opposed to flat.

"Cartilage push-down technique with bony cap preservation" works perfectly in flat dorsums. In S-shaped or acute humps where bony cap is more prominent, there is a need for nasal dorsal modifications. This allows the "modified cartilage push-down technique with bony cap rasping" to be carried out. The sharp hump on the bony crown of the skull is smoothed out with rasp or any alternative powered instrument (drill, piezzo etc.). Therefore, the bony cap island above the central cartilage roof turns from S-shaped to V or flat dorsum. Because the hump is less likely to appear again, concealment is unnecessary ([Supplementary Figures 1A-G, 2A-G, 3A-G](#)).

### Follow-up and Complications

In two patients, we ran into problems while rasping the nasal bones, and the procedure had to be modified so that just the cartilaginous push-down was used. During the 6 months after their treatment, modest hump recurrence occurred in 9 individuals (3%). After further treatment, the remaining patients' nasal humps were successfully eliminated.

## Results

Table I displays the hump measurements of both males and females. There were 42 men, 5 with a minor hump, 25 with a moderate hump,

**Table I.** Hump size of the males and females.

	Hump size			Total
	Small	Medium	Large	
Male	5	25	12	42
Female	88	160	10	258
Total	93	185	22	

and 12 with a massive hump. There were 258 women, 88 of whom had a little hump, 185 had a medium hump, and 22 had a huge hump.

Table II displays the surgeon's satisfaction with the low cartilaginous septal strip resection and high septal strip resection procedures. A total of 269 patients, 35 males, and 234 females had low cartilaginous septal strip resections, with 98 and 96% success rates, respectively, for the surgeons. There were 31 patients, seven men and 24 women, who all underwent high septal strip resections, with a 98% and 96% success rate for the surgeons.

Table III displays the percentage of satisfied customers based on the hump size. Rates of male satisfaction with humps ranged from 100% for little humps to 100% for medium humps to 99% for huge humps. Satisfaction percentages among women ranged from 98% in the case of little humps to 96% among medium humps and 95% among large humps.

## Discussion

Most modern rhinoplasties include removing the dorsal hump, creating an "open roof" that requires surgical osteotomies, and mid-vault reconstruction using upper lateral cartilage tensioning sutures, spreader grafts, or spreader flaps. In contrast, the dorsal preservation method keeps the dorsal components but removes the dorsal hump using septal excision and osteotomies. As

a result, the dorsum can be altered without compromising its structural integrity. Therefore, the dorsal aesthetic lines can be preserved without having to do a restoration of the midvault<sup>13</sup>.

The push-down described by Cottle<sup>14</sup>, the let-down techniques described by Huizing<sup>15</sup> and Drumheller<sup>16</sup> (modifications of Cottle's method involving an osseous wedge resection), and the cartilaginous push-down described by Ishida<sup>17</sup> are the three main approaches currently used in rhinoplasty that preserve the dorsum<sup>10</sup>. The first two reduce the hump holistically, leaving the dorsal and keystone ridge unharmed. Mainly, these techniques are indicated for patients with minor humps, little nasal aberrations, and a narrow nasal profile<sup>17-19</sup>. Cottle<sup>14</sup> and Drumheller<sup>16</sup> highlight the challenges associated with treating large, tilted, deviated, or broad humps using these methods.

The idea of dorsal preservation is straight forward: instead of making a standard dorsal reduction, surgeons perform a subdorsal resection to reduce the height of the patient's osseocartilaginous vault. When the keystone is not disturbed, and the central vault is not broken into, structural irregularities, asymmetry, and long-term deformation are prevented. From a technical standpoint, a few details need to be highlighted. In terms of technical difficulty, an open approach with a split tip is preferable to a closed one. Septal strip removal should cautiously begin at the W-point since doing so independently from anterior septal angle (ASA) reduction is preferable. When the dorsum is lowered too much in the caudal direction, it creates a saddle deformity that this sequence of excisions can hide. Since the septal strip provides a "bail-out" to the conventional reduction procedure, it is usually performed prior to any osteotomies. Compared to conventional reduction techniques, dorsal preservation results in a significantly smaller nose, particularly in the mesocephalic region, where the bony pyramid is reduced. The most crucial step in achieving

**Table II.** Satisfaction rate of the surgeon according to the low cartilaginous septal strip resection and high septal strip resection.

	Low cartilaginous septal strip resection		High septal strip resection	
	N	Satisfaction rate (surgeon) (%)	N	Satisfaction rate (surgeon) (%)
Male	35	98	7	98
Female	234	96	24	96
Total	269		31	

**Table III.** Satisfaction rate according to the size of the hump.

Satisfaction rate (%)	Hump size		
	Small	Medium	Large
Male	100	100	99
Female	98	96	95

positive outcomes is selecting the appropriate patients. Unless the dorsum has not been manipulated during surgery and the septum is still in place, dorsal preservation seldom matters during a subsequent rhinoplasty<sup>13</sup>.

This work introduced a novel preservation method for dehumping the dorsum based on a variant of the cartilage push-down (Ishida) procedure<sup>1</sup>. This allows for the development of the modified cartilage push-down with the bony cap rasping procedure. A sharp hump or bony cap is smoothed off with a file. Therefore, the bony cap island above the central cartilage roof is much thinner. Because the hump is less likely to appear again, concealment is unnecessary. As a result of complications in two patients, the nasal bone rasping procedure had to be modified to use just the cartilaginous push-down during follow-up. During the first several weeks after their treatment, modest hump recurrence occurred in 13 individuals (3%). After further treatment, all of the remaining patients' nasal humps were successfully eliminated.

In males (n=126), our method found that 10 had a little hump, 68 had a moderate hump, and 48 had a large hump. There were 294 females, 88 of whom had a little hump, 202 had a medium hump, and 4 had a huge hump.

Indicative of surgeon satisfaction with low cartilaginous septal strip excision vs. high septal strip resection include the following: with a total of 389 patients, 98 males, and 295 females had low cartilaginous septal strip resections, with 98 and 96% success rates, respectively, for the surgeons. There were 31 patients, seven men and 24 women, who all underwent high septal strip resections, with a 98% and 96% success rate for the surgeons.

It was found that there was a correlation between the size of the hump and the level of satisfaction felt by its bearers. Rates of male satisfaction with humps ranged from 100% for little humps to 100% for medium humps to 99% for huge humps. Satisfaction percentages among

women ranged from 98% in the case of little humps to 96% among medium humps and 95% among large humps.

Saban<sup>18</sup> and Saban et al<sup>20</sup> have recently simplified Cottle's initial push-down method by resecting a high subdorsal septal strip, allowing the dorsal convexity to flatten. Either a push-down or a let-down treatment can be used to mobilize and reduce the height of the bony nasal pyramid. The bony pyramid is lowered into the pyriform opening using a push-down operation. In a let-down surgery, the bony pyramid is reduced by cutting away bone from the side of the face where the nose meets the maxilla. When relaxed, the bony pyramid can rest on the maxillary apex or even drop into the pyriform opening.

Following Ishida et al<sup>10</sup> instructions, the cartilage will be OK. When first developed, this method was restricted to using relatively flat humps of varying sizes. Once the anatomy of the keystone was known entirely, the principal indicators for the cartilaginous preservation strategy expanded to include big and/or deviating humps.

The nasal dorsum and keystone are protected during the push-down and let-down operations; nevertheless, patients with very wide, big, or crooked humps may need further procedures to get an optimal result in reducing and straightening the hump<sup>21</sup>. The nasal bridge, in particular, may develop a void if the patient has a huge bony hump that becomes difficult to accommodate. Additional operations may be necessary for the correct lowering of nasal humps if the bony and cartilaginous sections form a considerable angle with one another<sup>1,22</sup>.

Although dorsal hump resections are a staple of traditional rhinoplasty, Patel et al<sup>23</sup> noted a renewed interest in this approach due to promises of greater functional and cosmetic outcomes. The natural keystone region is protected from manipulation by preserving the dorsum of the nose. In order to lower the nasal dorsum, the osseous nasal vault is operated using a transverse osteotomy and either a bilateral single lateral osteotomy (push-down treatment) or bilateral bony wedge resections (let-down technique). Septal procedures can be classified as subdorsal, high-septal, mid-septal, or inferior, depending on where the cartilage is removed. Even if these methods produce more aesthetically acceptable dorsal contours, they may be constrained by a greater recurrence rate of the dorsal hump. It is hypothesized<sup>23</sup> that dorsal preservation of the internal nasal valve (INV) increases its patency.



Although robust series reporting patient results are sparse, prior experience at our facility using a newly disclosed high-septal excision approach suggests promising functional and aesthetic outcomes with dorsal preservation.

Whether you use the let-down (LD) or push-down (PD) strategy to correct your child's sleeping position might be influenced by several things. There may not be enough room for the nasal pyramid to descend using a PD approach if the dorsal hump is >4 mm. The LD method has been recommended for humps larger than 4 mm<sup>23,24</sup>. Our first cadaveric investigations indicate that the PD approach causes the internal nasal valve (INV) to contract, making the nose easier to breathe through<sup>25</sup>. The LD procedure does not exhibit this behavior. This may have consequences for preferentially employing the LD method rather than the PD one, but studies are still needed to see if this has any practical significance for patients.

### Limitations

The limitation of our study is that the statistical analysis was not performed.

### Conclusions

Our technique of modification of the cartilage push-down (Ishida)<sup>1</sup> method is applied for dehumping the dorsum. High satisfaction percentages were obtained from the patients and surgeons. This technique may be a good option for patients who need dehumping.

### Conflict of Interest

The Authors declare that they have no conflict of interests.

### Ethics Approval

Ethics Committee approval was obtained from Bilecik Şeyh Edebali University, Non-invasive Clinical Researches Ethics Committee (Date: 07.02.2023, Number: 3).

### Informed Consent

As the data were collected retrospectively, informed consent form was not needed. For Figures 2 and 3, the patients gave written permission for these figures to be published as her face to be recognized.

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There are no funds for this study.

### Authors' Contribution

Elad Azizli: Planning, designing, literature survey, performing the surgeries, data collection, interpretation of the results, active intellectual support, writing. Nuray Bayar Muluk: Planning, designing, literature survey, interpretation of the results, active intellectual support, writing, submission. Rıza Dündar: Planning, designing, literature survey, interpretation of the results, active intellectual support. Cemal Cingi: Planning, designing, literature survey, interpretation of the results, active intellectual support, English editing.

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