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A Data Base Research on Evaluation on Stability in Rhinoplasty using Septal Graft or Costochondral Graft Systematic Review & Meta Analysis

Dr. Keshini MP[1], Dr.Asma Ahmed[2],Dr.Krishna Lohitha.K[3], Dr.Asfar Zeya[4], DrSachin S. Hotkar[5], Dr. AshwinHiremath[6], Dr. Rahul VC Tiwari[7]

[1]MDS,Senior resident, Dept of Craniofacial anomalies, Kanachur institute of medical Sciences, Natekal, Mangalore. keshini.mp@gmail.com
[2]Pg 3rd yrDept of ENT & HEAD &NECK Surgery, Government medical hospital, Jammu.asmaahmed074@gmail.com
[3]Fellow in orthognathic surgery and craniofacial anamolies, Kanachur Institute of Medical sciences, Natekal,Mangalore.krishnalohitha94@gmail.com
[4]Senior resident, Dept of oral and maxillofacial surgery, Adesh institute of dental sciences and research, Adeshuniversity, Bathinda, Punjab. asfarzeya@gmail.com
[5]PG Student,Dept of Oral & Maxillofacial Surgery , YMT Dental CollegeKhargharNavi Mumbai. drsachinhotkar@gmail.com
[6]Consultant Oral & Maxillofacial Surgeon, Redymed Cosmetic Surgery And Hair Transplant Center, Belgaum, Karnataka, India
[7]OMFS, FOGS, PhD Scholar, Dept of OMFS, Narsinbhai Patel Dental College and Hospital, Sankalchand Patel University, Visnagar, Gujarat,384315. drrahulvctiwari@gmail.com

Corresponding Author:
Dr. Keshini MP, MDS,Senior resident, Dept of Craniofacial anomalies, Kanachur institute of medical Sciences, Natekal, Mangalore. keshini.mp@gmail.com

ABSTRACT

Introduction: Augmentation rhinoplasty requires adding cartilage to provide enhanced support to the structure of the nose. Autologous costal cartilage and irradiated homologous costal cartilage (IHCC) are well-accepted rhinoplasty options. Hence in the present study we aim to evaluate thestability in Rhinoplasty using septal graft from the online data search.

Material and methods: Online data was collected from the search engines of EBSCO, Pubmed, Google Scholar, Scopus. The searched terms were septorhinoplasty, rhinoplasty, autologous costal cartilage graft, cadaveric cartilage graft, and rib graft.etc. The study articles were collected. Based on the PRISMA guidelines the meta analysis was performed.

Results: From a total of 575, 28 studies were finalized. Our search captured 1041 patients of whom 741 received autologous grafts and 293 received IHCC grafts (regardless of type). When autologous cartilage vs IHCC vsTutoplast cartilage grafts were compared, no difference in the stability that was measured through various parameters were found.

Conclusions: Similar results were seen for stability in the various types of septal graft or costal cartilage grafts. En bloc dorsal onlay grafts are commonly used in augmentation rhinoplasty to provide contour and structure to the nasal dorsum.

Key words: Rhinoplasty, Septal Graft, Meta Analysis

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Introduction

Augmentation rhinoplasty necessitates the addition of cartilage to deliver superior support to the nose structure. Though septal cartilage is a brilliant source if available, additional material is often required for revision. Costal and auricular cartilages are widely acknowledged sources and supposed to be superior to alloplastic implants because of the lower risk of infection and extrusion.[1-5] Because of the larger amount of cartilage available with costal cartilage compared with auricular cartilage, costal cartilage is often the graft of choice in augmentation rhinoplasty.Though, the use of costal cartilage has hazards. The risk of warping and failure is often debated, which has incited different maneuvers to alleviate this risk, including carving techniques, suture techniques, microplate fixation, and Kirschner wires. Also, the added morbidity seen with harvesting costal cartilage, plus potential pneumothorax, scarring, and postoperative pain, in addition to the added operative time raise the question of if homologous costal cartilage can give a similar result without harvesting autologous cartilage.[2,5,11]Given the varying results on outcomes with in rhinoplasty, no studies, were done to evaluate the stability.[7-10] Hence in the present study we aim to evaluate thestability in Rhinoplasty using septal graft from the online data search. We aimed to compare rates of complications associated with autologous vs IHCC grafts in patients undergoing augmentation rhinoplasty that data like graft resorption, infection, warping, contour irregularity, and revision rates.

Material and methods

Online data was collected from the search engines of EBSCO, Pubmed, Google Scholar, Scopus. The searched terms were septorhinoplasty, rhinoplasty, autologous costal cartilage graft, cadaveric cartilage graft, and rib graft.etc. The study articles were collected that from Jan 2019 to Feb 2021.Two reviewers independently checked the data collected and disputes resolved by consensus. Those patients who endured an en bloc dorsal onlay graft were included for comparison to ensure a homogenous study sample. A total of 1307 results were found. After duplicate records were removed, 575 unique citations remained. Studies were published worldwide between January 1, 1990, and December 31, 2017.

Results

The search strategy resulted in 575 exclusive citations. Finally 55 studies were included in our systematic review (Figure 1). Twenty- eight studies were included for meta-analysis, all of which were retrospective cohort studies. These studies comprised 1042 patients of whom 742 received autologous grafts and 291 received IHCC grafts. Studies were published between January 1, 1990, and December 31, 2017; the mean sample size was 36 patients. Mean follow-up time ranged from 1 to 2 years. No difference was found in follow-up between groups, with mean follow-up periods of 23.2 months for autologous costal cartilage studies, 31.2 months for IHCC studies, and 18.7 months for Tutoplast studies. No difference was seen by comparing autologous cartilage (n = 748) vs IHCC (n = 153) vsTutoplast cartilage (n = 140) used for en bloc dorsal onlay grafts, for the rate of warping resorption, contour irregularity, infection, and revision surgery. Table 1. Figure 2, Figure 3, and Figure 4 display the forest plots for each meta-analysis. The risk of biaswas rated as high for 23 studies and unclear for 5 studies. The primary reason for the high risk of bias rating in those studies was lack of blinding, with the primary surgeon being responsible for the patient aesthetic evaluation (eg, warping and contour irregularity).

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Figure 1. Flow chart describing the selection of the articles

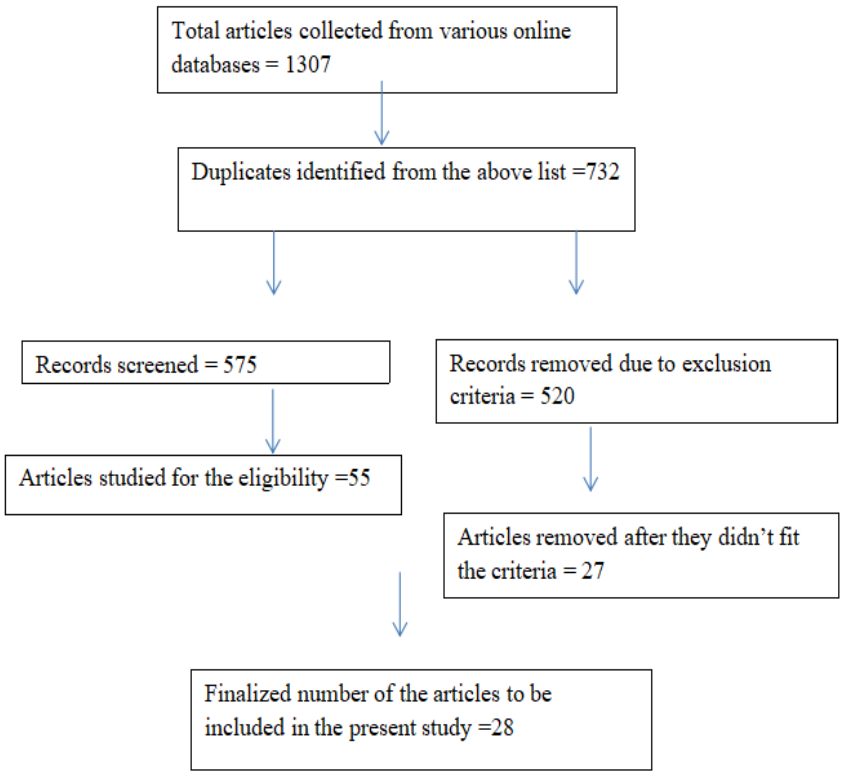

Table 1. Overall Summary of Meta-analyses

Total No.			Pooled Event Rate, %	
Outcome, Graft Type	Studies[a]	Patients	(95% CI)	Heterogeneity, I^2
Warping				
Autologous cartilage	18	679	6 (2-11)	76.8
Irradiated homologous	5	153	5 (1-12)	42.0
Tutoplast homologous	3	140	4 (1-9)	27.6
Overall	26	972	5 (3-9)	72.4
Resorption				
Autologous cartilage	16	502	1 (0-2)	0
Irradiated homologous	5	153	4 (0-13)	71.7
Tutoplast homologous	3	140	11 (0-48)	93.0
Overall	24	795	2 (0-5)	61.0
Contour Irregularity				
Autologous cartilage	9	215	0 (0-3)	0
Irradiated homologous	3	109	3 (0-7)	0
Tutoplast homologous	2	75	4 (0-10)	9.7
Overall	14	399	1 (0-3)	0
Infection				

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Autologous cartilage	15	493	2 (0-5)	45.5
Irradiated homologous	5	153	3 (1-8)	0
Tutoplast homologous	2	100	0 (0-2)	64.6
Overall	22	746	2 (0-4)	41.7
Revisions				
Autologous cartilage	18	613	5 (1-10)	75.9
Irradiated homologous	4	133	7 (3-12)	0
Tutoplast homologous	3	140	3 (0-8)	23.4
Overall	25	886	5 (2-9)	70.3

Figure 2. Warping Rates - Meta-analysis

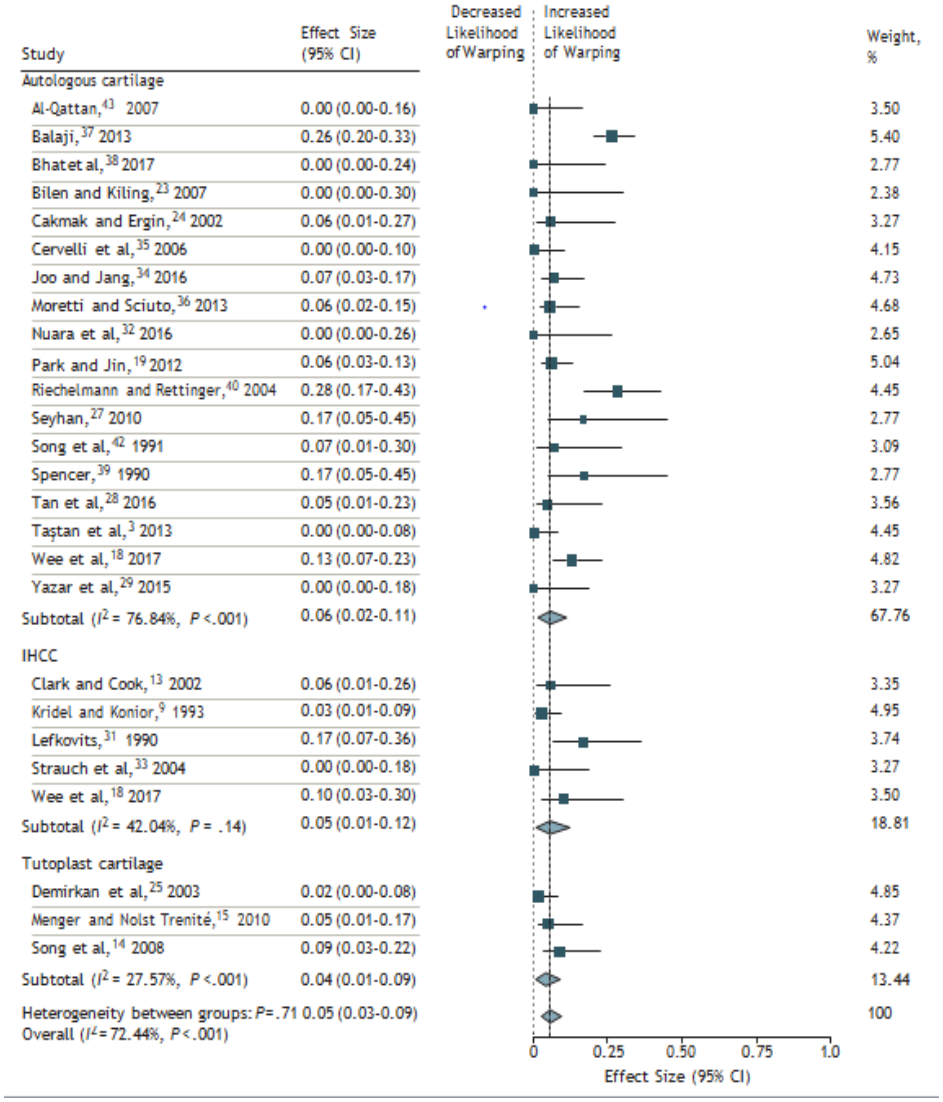

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Figure 3.Resorption Rates - Meta-analysis

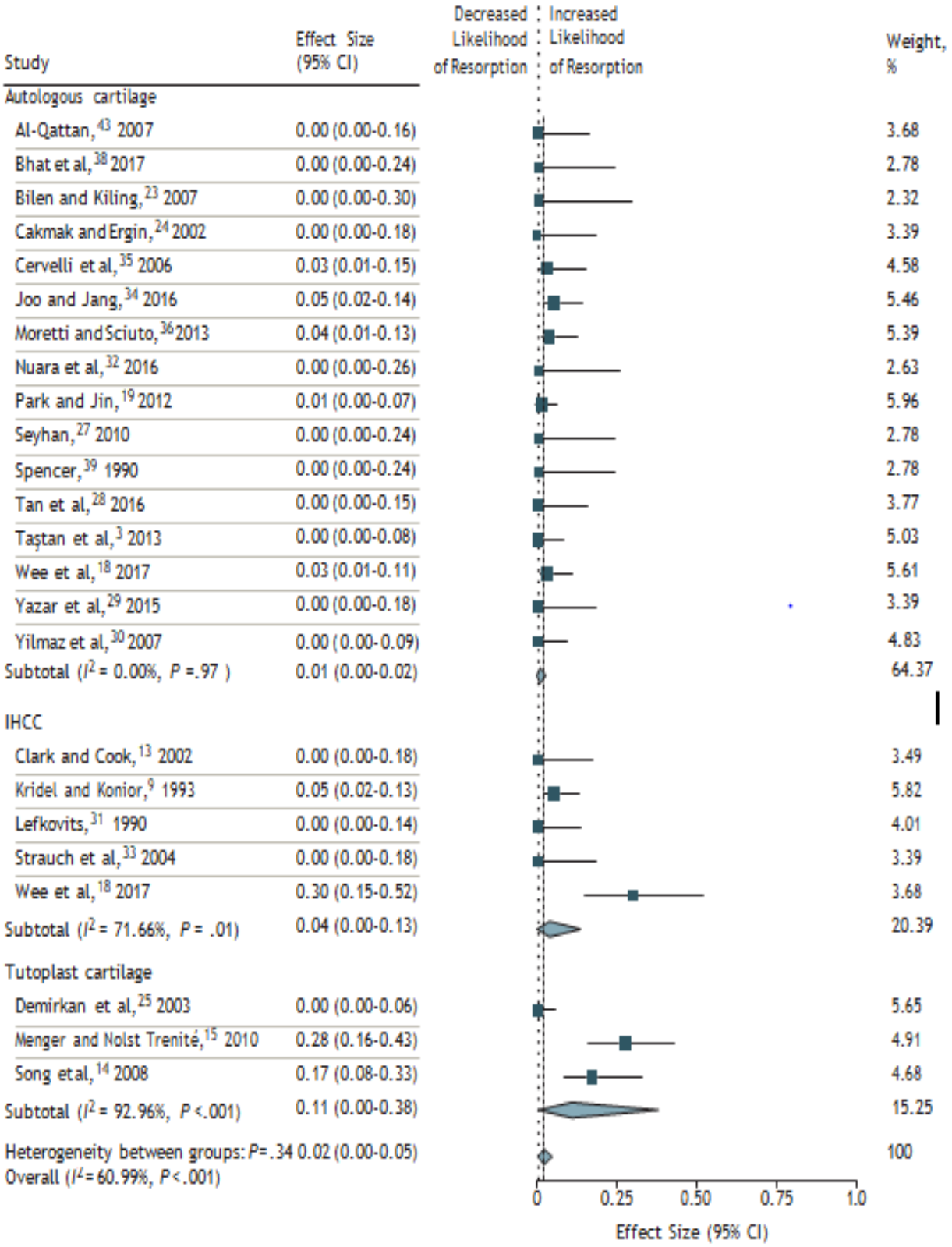

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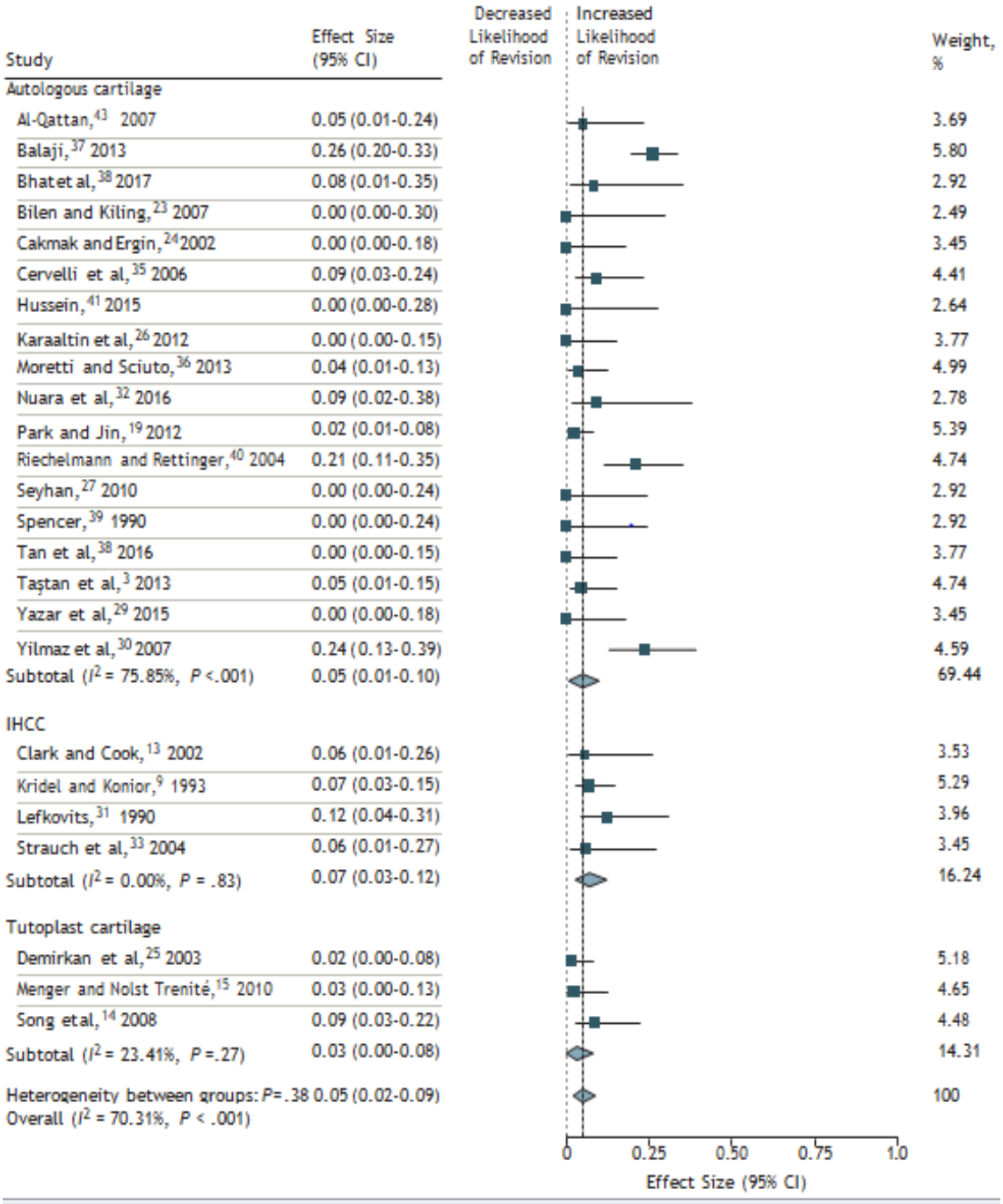
Figure 4. Revision Rates- Meta-analysis



Discussion

In the present study there was no difference in outcomes between autologous costal cartilage, IHCC, and Tutoplast cartilage grafts was observed among nearly 1000 subjects. Low heterogeneity was seen among studies, for the rates of contour irregularity and infection. This observation validates that the rate of these 2 outcomes are relatively robust and do not vary greatly among the selected articles, denoting that contour irregularity and infection are not

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sensitive to technique, not sensitive to graft type, or both. But, significant heterogeneity was found among studies in the rates of warping, resorption, and revision. Noteworthy, the studies with the maximum reported warping rates were also the studies with the greatest revision rates. If the technique used in these studies led to higher warping rates and thus required higher revision rates is unknown. Though, when pooling all included studies, no difference was seen in warping or revision rates among the autologous and homologous grafts. The likelihood that warping and/or resorption may be subtle in few cases and thus not reported equally among all studies may explain the variability. Revision rates are likely influenced by individual surgeons, and surgeons' willingness to revise their procedures substantially adds to the variation noted among studies. Our results help to address a controversial debate among rhinoplasty surgeons regarding the equivalency of homologous compared with autologous rib cartilage in dorsal onlay grafts. The problem of whether homologous grafts can be used as structural grafts (eg, columellar strut grafts and lateral crural grafts) is worthy of future study. There were few limitations like we were inept to determine if the homologous grafts can be used as structural grafts from our data because of the limitations in the way results are reported in the literature. Patient-reported outcome measures were also not considered. When studies discuss revision rates, it is impossible to know if patients went to another surgeon after being lost to follow-up, but this is a universal problem with all published studies. Thus, there may be an overall underestimation of the revision rates stated. In addition, some surgeons may be quicker to perform revision surgery than others.

Conclusion

We found no difference in stability between autologous cartilage and IHCC grafts, including rates of warping, resorption, infection, contour irregularity, or revisions. Whether autologous cartilage and IHCC cartilage are equivalent in structural grafts in rhinoplasty, such as columellar strut or lateral crural strut grafts, remains a question for future research.

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