

References for the Facial Features and Measurements

The reference number(s) listed for a facial feature or measurement on digitized-rhinoplasty.com correspond to the citations listed in the reference list below. Please note that this reference list is from our following publication which includes more facial features and measurements:

- Mazhar Celikoyar, Michael Perez, Mustafa Ilhan Akbaş, Oguzhan Topsakal. "Facial Surface Anthropometric Features and Measurements With an Emphasis on Rhinoplasty", Aesthetic Surgery Journal (2021) sjab190,

Link to our publication:

- <https://doi.org/10.1093/asj/sjab190>

REFERENCES

1. Dobratz EJ, Tran V, Hilger PA. Comparison of techniques used to support the nasal tip and their long-term effects on tip position. *Arch Facial Plast Surg.* 2010;12(3):172-179.
2. Palma P, Khodaei I, Tasman AJ. A guide to the assessment and analysis of the rhinoplasty patient. *Facial Plast Surg.* 2011;27(2):146-159.
3. Brito ÍM, Avashia Y, Rohrich RJ. Evidence-based nasal analysis for rhinoplasty: the 10-7-5 method. *Plast Reconstr Surg Glob Open.* 2020;8(2):e2632.
4. Tollefson TT, Sykes JM. Computer imaging software for profile photograph analysis. *Arch Facial Plast Surg.* 2007;9(2):113-119.
5. Apaydin F, Akyildiz S, Hecht DA, et al. Rhinobase: a comprehensive database, facial analysis, and picture-archiving software for rhinoplasty. *Arch Facial Plast Surg.* 2009;11(3):203-211.
6. Zacharopoulos GV, Manios A, Kau CH, Velagrakis G, Tzanakakis GN, de Bree E. Anthropometric analysis of the face. *J Craniofac Surg.* 2016;27(1):e71-e75.
7. Farkas L. *Anthropometry of the Head and Face in Medicine.* 1st ed. Philadelphia, PA: Elsevier; 1981.
8. Farkas L. *Anthropometry of the Head and Face.* 2nd ed. New York: Raven Press; 1994.
9. Farkas LG, Hreczko TM, Katic MJ, Forrest CR. Proportion indices in the craniofacial regions of 284 healthy North American white children between 1 and 5 years of age. *J Craniofac Surg.* 2003;14(1):13-28.
10. Rohrich RJ, Malafa MM, Ahmad J, Basci DS. Managing alar flare in rhinoplasty. *Plast Reconstr Surg.* 2017;140(5):910-919.
11. Gunter JP, Rohrich RJ, Friedman RM. Classification and correction of alar-columellar discrepancies in rhinoplasty. *Plast Reconstr Surg.* 1996;97(3):643-648.
12. Aung SC, Foo CL, Lee ST. Three dimensional laser scan assessment of the Oriental nose with a new classification of Oriental nasal types. *Br J Plast Surg.* 2000;53(2):109-116.
13. Gruber RP, Stepnick D. Rhinoplasty: current concepts. Preface. *Clin Plast Surg.* 2010;37(2):xiii-xxiv.
14. Woelfel JB, Igarashi T, Dong JK. Faculty-supervised measurements of the face and of mandibular movements on young adults. *J Adv Prosthodont.* 2014;6(6):483-490.
15. Larrabee W, Makielski K, Henderson J. *Surgical Anatomy of the Face.* Philadelphia, PA: Lippincott Williams & Wilkins;2004.
16. Malkoç S, Demir A, Uysal T, Canbuldu N. Angular photogrammetric analysis of the soft tissue facial profile of Turkish adults. *Eur J Orthod.* 2009;31(2):174-179.
17. Asghari A, Rajaeih S, Hassannia F, et al. Photographic facial soft tissue analysis of healthy Iranian young adults: anthropometric and angular measurements. *Med J Islam Repub Iran.* 2014;28:49.
18. Brinkley JF, Fisher S, Harris MP, et al.; FaceBase Consortium. The FaceBase Consortium: a comprehensive resource for craniofacial researchers. *Development.* 2016;143(14):2677-2688.
19. Bashour M. An objective system for measuring facial attractiveness. *Plast Reconstr Surg.* 2006;118(3):757-774; discussion 775.
20. Park C, Lee M, Jung Y. Photogrammetric facial analysis of attractive celebrities using the glabella for planning rhinoplasty and analyzing surgical outcomes. *Arch Aesthet Plastic Surg.* 2018;24:105-110.
21. Encyclopaedia Britannica TE. *Iris.* Chicago, IL:Encyclopaedia Britannica, Inc.; 2019.
22. Lazovic GD, Daniel RK, Janosevic LB, Kosanovic RM, Colic MM, Kosins AM. Rhinoplasty: the nasal bones - anatomy and analysis. *Aesthet Surg J.* 2015;35(3):255-263.

23. Kasai K. Soft tissue adaptability to hard tissues in facial profiles. *Am J Orthod Dentofacial Orthop.* 1998;113(6):674-684.
24. Crumley R, Lancer M. The anatomy of the limbus. *Eye.* 1988;3:101-108.
25. Preedy V. *Handbook of Anthropometry Physical Measures of Human Form in Health and Disease.* New York: Springer; 2012.
26. Ercan I, Etoz A, Guney I, et al. Statistical shape analysis of nose in Turkish young adults. *J Craniofac Surg.* 2007;18(1):219-224.
27. Ukoha UU, Udemezue OO, Oranusi CK, Asomugha AL, Dimkpa U, Nzeukwu LC. Photometric facial analysis of the Igbo Nigerian adult male. *Niger Med J.* 2012;53(4):240-244.
28. Toriumi D, Tardy E, Garner E. The overprojecting nose: aesthetics, diagnosis, and management. *Oper Tech Otolaryngol Head Neck Surg.* 1990;1(3):153-157.
29. Okur E, Yildirim I, Aydogan B, Akif Kilic M. Outcome of surgery for crooked nose: an objective method of evaluation. *Aesthetic Plast Surg.* 2004;28(4):203-207.
30. Bonfort G, Nguyen DT, Rumeau C, Jankowski R. Nasal or canthal-alar parentheses: a study of the facial base of the nose. *Eur Ann Otorhinolaryngol Head Neck Dis.* 2016;133(6):377-381.
31. Zogheib T, Jacobs R, Bornstein MM, et al. Comparison of 3D scanning versus 2D photography for the identification of facial soft-tissue landmarks. *Open Dent J.* 2018;12:61-71.
32. Toriumi D, Becker D. *Rhinoplasty Dissection Manual.* Baltimore, MD: Lippincott Williams & Wilkins; 1999.
33. Swennen G, Schutyser F, Hausamen J. *Three-Dimensional Cephalometry. A Color Atlas and Manual.* Berlin: Springer Science and Business Media; 2006.
34. Meruane M, Ayala MF, García-Huidobro MA, Andrade P. Reliability of nasofacial analysis using Rhinobase® soft-ware. *Aesthetic Plast Surg.* 2016;40(1):149-156.
35. Othman SA, Aidil Koay NA. Three-dimensional facial analysis of Chinese children with repaired unilateral cleft lip and palate. *Sci Rep.* 2016;6:31335.
36. Rajion ZA, Townsend GC, Netherway DJ, et al. A three-dimensional computed tomographic analysis of the cervical spine in unoperated infants with cleft lip and palate. *Cleft Palate Craniofac J.* 2006;43(5):513-518.
37. Djordjevic J, Toma AM, Zhurov AI, Richmond S. Three-dimensional quantification of facial symmetry in adolescents using laser surface scanning. *Eur J Orthod.* 2014;36(2):125-132.
38. Guyuron B. *Rhinoplasty: Expert Consult - Online.* Philadelphia, PA: Elsevier Health Sciences; 2012.
39. Adamson P, Karimi K. *Nasal tip surgery - the M-Arch model. Rhinoplasty Archive.* 2017. <https://www.rhinoplastyarchive.com/articles/nasal-tip-surgery-m-arch-mode>. Accessed December 21, 2020.
40. Sheen J, Sheen A. *Aesthetic Rhinoplasty.* New York: Thieme; 1998.
41. Warren R, Neligan P. *Plastic Surgery - E-Book: Volume 2:Aesthetic Surgery (Expert Consult -Online).* Plastic Surgery: Aesthetic. Philadelphia, PA: Elsevier Health Sciences; 2012.
42. Springer IN, Zernal O, Nölke F, et al. Gender and nasal shape: measures for rhinoplasty. *Plast Reconstr Surg.* 2008;121(2):629-637.
43. Turvey TA, Golden BA. Orbital anatomy for the surgeon. *Oral Maxillofac Surg Clin North Am.* 2012;24(4):525-536.
44. Rohrich R, Adams W, Ahmad J, et al. *Dallas Rhinoplasty:Nasal Surgery by the Masters.* 3rd ed. New York: Thieme;2014.
45. Guyuron B, Kinney B. *Aesthetic Plastic Surgery Video Atlas.* Philadelphia, PA: Elsevier; 2011.
46. Simon PE, Lam K, Sidle D, Tan BK. The nasal keystone region: an anatomical study. *JAMA Facial Plast Surg.* 2013;15(3):235-237.
47. Kim IS, Chung YJ, Lee YI. An anatomic study on the overlap patterns of structural components in the keystone area in noses of Koreans. *Clin Exp Otorhinolaryngol.* 2008;1(3):158-160.
48. Razfar A, Hajjalipour S, Kheradmand A, et al. The effect of caudal extension graft on nostril in rhinoplasty. *Eur J Plast Surg.* 2017;40:513-516.
49. Çakir B, Öreroğlu AR, Daniel RK. Surface aesthetics in tip rhinoplasty: a step-by-step guide. *Aesthet Surg J.* 2014;34(6):941-955.
50. Soares CM, Mocelin M, Pasinato R, Berger CA, Grocoske FL, Issa MJ. Evaluating the effectiveness of the lateral intercrural suture to decrease the interdomal distance to improve the definition of the nasal tip in primary rhinoplasty. *Int Arch Otorhinolaryngol.* 2014;18(2):92-107.
51. Aung SC, Ngim RC, Lee ST. Evaluation of the laser scanner as a surface measuring tool and its accuracy compared with direct facial anthropometric measurements. *Br J Plast Surg.* 1995;48(8):551-558.
52. Suhk J, Park J, Nguyen AH. Nasal analysis and anatomy: anthropometric proportional assessment in Asians- aesthetic balance from forehead to chin. Part I. *Semin Plast Surg.* 2015;29(4):219-225.
53. Arroyo HH, Olivetti IP, Lima LF, Jurado JR. Clinical evaluation for chin augmentation: literature review and algorithm proposal. *Braz J Otorhinolaryngol.* 2016;82(5):596-601.
54. Farkas LG, Hreczko TA, Deutsch CK. Objective assessment of standard nostril types-a morphometric study. *Ann Plast Surg.* 1983;11(5):381-389.
55. Razfar A, Hajjalipour S, Kheradmand A, et al. The effect of caudal extension graft on nostril in rhinoplasty. *Eur J Plast Surg.* 2017;40:513-516.
56. Sim RS, Smith JD, Chan AS. Comparison of the aesthetic facial proportions of southern Chinese and white women. *Arch Facial Plast Surg.* 2000;2(2):113-120.
57. Pallett PM, Link S, Lee K. New "golden" ratios for facial beauty. *Vision Res.* 2010;50(2):149-154.
58. Alexander AJ, Shah AR, Constantinides MS. Alar retraction: etiology, treatment, and prevention. *JAMA Facial Plast Surg.* 2013;15(4):268-274.
59. Gode S, Tiris FS, Akyildiz S, Apaydin F. Photogrammetric analysis of soft tissue facial profile in Turkish rhinoplasty population. *Aesthetic Plast Surg.* 2011;35(6):1016-1021.
60. Asghari A, Rajaeih S, Hassannia F, et al. Photographic facial soft tissue analysis of healthy Iranian young adults: anthropometric and angular measurements. *Med J Islam Repub Iran.* 2014;28:49.

61. Pousti SB, Jalessi M, Asghari A. Management of nasofrontal angle in rhinoplasty. *Iran Red Crescent Med J*. 2010;12(1):7-11.
62. Reddy PS, Kashyap B, Hallur N, Sikkerimath BC. Advancement genioplasty–cephalometric analysis of os-seous and soft tissue changes. *J Maxillofac Oral Surg*. 2011;10(4):288-295.
63. Silveira FGL. Analysis of the anatomical lines of the medial nasal dorsum after use of spreader grafts in open rhino- plasty. *Braz J Otorhinolaryngol*. 2015;31:453-460.
64. Soliemanzadeh P, Kridel RW. Nasal tip overprojection: algorithm of surgical deprojection techniques and introduction of medial crural overlay. *Arch Facial Plast Surg*. 2005;7(6):374-380.
65. Spörrl S, Simmen D, Briner HR, Jones N. Objective assessment of tip projection and the nasolabial angle in rhinoplasty. *Arch Facial Plast Surg*. 2004;6(5):295-298; discussion 299.
66. Zhang Y, Prakash E. Face to face: anthropometry-based interactive face shape modeling using model priors. *Int J Computer Games Technology*. 2009; 2009:1-15.
67. Steiger JD, Baker SR. Nuances of profile management: theradix. *Facial Plast Surg Clin North Am*. 2009;17(1):15-28, v.
68. Suh M. *Atlas of Asian Rhinoplasty*. Singapore: Springer Singapore; 2018.
69. Gruber RP, Kwon E, Berger A, Belek KA. Supratip-plasty: a completely cartilaginous tip complex to maintain nasal tipwidth. *Aesthet Surg J*. 2014;34(1):34-44.
70. Mowlavi A, Meldrum DG, Wilhelmi BJ. Implications for nasal recontouring: nasion position preferences as determined by a survey of white North Americans. *Aesthetic Plast Surg*. 2003;27(6):438-445.
71. Park HS, Rhee SC, Kang SR, Lee JH. Harmonizedprofiloplasty using balanced angular profile analysis. *Aesthetic Plast Surg*. 2004;28(2):89-97.
72. Kim DW, Egan KK. Metrics of nasal tip rotation: a comparative analysis. *Laryngoscope*. 2006;116(6):872-877.
73. Harris R, Nagarkar P, Amirlak B. Varied definitions of nasolabial angle: searching for consensus among rhinoplasty surgeons and an algorithm for selecting the ideal method. *Plast Reconstr Surg Glob Open*. 2016;4(6):e752.
74. Toriumi DM. New concepts in nasal tip contouring. *Arch Facial Plast Surg*. 2006;8(3):156-185.
75. Erdem T, Ozturk O. Objective measurement of the deviated nose and a review of surgical techniques for correction. *Rhinology*. 2008;46:56-61.
76. Rohrich RJ, Adams WP Jr. The boxy nasal tip: classification and management based on alar cartilage suturing techniques. *Plast Reconstr Surg*. 2001;107(7):1849-1863; discussion 1864.
77. Erian A, Shiffman M. *Advanced Surgical Facial Rejuvenation: Art and Clinical Practice*. Berlin, Heidelberg, Germany: Springer; 2010.
78. Fernández-Riveiro P, Smyth-Chamosa E, Suárez- Quintanilla D, Suárez-Cunqueiro M. Angular photogrammetric analysis of the soft tissue facial profile. *Eur J Orthod*. 2003;25(4):393-399.
79. Sforza C, Rosati R, De Menezes M, et al. Three-dimensional computerized anthropometry of the nose. In: Preedy V, ed. *Handbook of Anthropometry Physical Measures of Human Form in Health and Disease*. New York: Springer;2012:927-942.
80. Beugre JB, Diomande M, Assi AR, Koueita MK, Vaysse F. Angular photogrammetric analysis and evaluation of facial esthetics of young Ivorians with normal dental occlusion. *Int Orthod*. 2017;15(1):25-39.
81. Brown M, Guyuron B. Redefining the ideal nasolabial angle: part 2. Expert analysis. *Plast Reconstr Surg*. 2013;132(2):221e-225e.
82. Armijo BS, Brown M, Guyuron B. Defining the idealnasolabial angle. *Plast Reconstr Surg*. 2012;129(3):759-764.
83. Mojallal A, Ouyang D, Saint-Cyr M, Bui N, Brown SA, Rohrich RJ. Dorsal aesthetic lines in rhinoplasty: a quantitative outcome-based assessment of the component dorsal reduction technique. *Plast Reconstr Surg*. 2011;128(1):280-288.
84. Zelken JA, Hong JP, Broyles JM, Hsiao YC. Preventing elevated radix deformity in Asian rhinoplasty with a chimeric dorsal-glabellar construct. *Aesthet Surg J*. 2016;36(3):287-296.
85. Crumley RL, Lanser M. Quantitative analysis of nasal tip projection. *Laryngoscope*. 1988;98(2):202-208.
86. Devcic Z, Rayikanti BA, Hevia JP, Popenko NA, Karimi K, Wong BJ. Nasal tip projection and facial attractiveness. *Laryngoscope*. 2011;121(7):1388-1394.
87. Devan P, Jacono A, Strong B, et al. *Nasal tip projection rhinoplasty*. 2016. <https://emedicine.medscape.com/article/840646-treatment/>. Accessed December 21, 2020.
88. Gharib F, AlMahdy A, ElBestar M. Assessment of nasal tip projection. *Egypt J Otolaryngol*. 2015;31:105.
89. Hetzler L, Givens V, Sykes J. The tripod concept of the uppernasal third. *JAMA Facial Plast Surg*. 2019;21(6):498-503.
90. Leong SC, White PS. A comparison of aesthetic proportions between the healthy Caucasian nose and the aesthetic ideal. *J Plast Reconstr Aesthet Surg*. 2006;59(3):248-252.
91. Zelken J, Chang CS, Chuang SS, Yang JY, Hsiao YC. An economical approach to ethnic Asian rhinoplasty. *FacialPlast Surg*. 2016;32(1):95-104.
92. Ozkul T, Ozkul H, Akhtar R, et al. A software tool for measurement of facial parameters. *Open Chem BiomedMethods J*. 2009;2:69-74.
93. Farkas LG, Kolar JC, Munro IR. Geography of the nose: a morphometric study. *Aesthetic Plast Surg*. 1986;10(4): 191-223.
94. Tasman AJ. Rhinoplasty - indications and techniques. *GMSCurr Top Otorhinolaryngol Head Neck Surg*. 2007;6:Doc09.
95. Ghanaatpisheh M, Sajjadi A, Daniel RK. Superior rhinoplasty outcomes with precise nasal osteotomy: an individualized approach for maintaining function and achieving aesthetic goals. *Aesthet Surg J*. 2015;35(1):28-39.
96. Ballert JA, Park SS. Functional considerations in revision rhinoplasty. *Facial Plast Surg*. 2008;24(3):348-357.
97. Selvaraj L. Novel technique and simple approach for supra-alar region and supra-alar crease correction by supra-alar cinching. *Natl J Maxillofac Surg*. 2016;7(1):108-110.

98. Jang YJ, Yu MS. Rhinoplasty for the Asian nose. *FacialPlast Surg.* 2010;26(2):93-101.
99. Meyer R, Berster J-C, Emeri J-F, et al. *SecondaryRhinoplasty: Including Reconstruction of the Nose*. Heidelberg, Germany: Springer Science and Business Media; 2002.
100. Rohrich RJ, Deuber MA. Nasal tip refinement in primary rhinoplasty: the cephalic trim cap graft. *Aesthet Surg J.* 2002;22(1):39-45.
101. Irwin M, Milling MAP. The morphology of the nostril sill. *Eur J Plast Surg.* 1995;4:276-280.
102. Calloway HE, Heilbronn CM, Gu JT, Pham TT, Barnes CH, Wong BJ. Functional outcomes, quantitative morphometry, and aesthetic analysis of articulated alar rim grafts in septorhinoplasty. *JAMA Facial Plast Surg.* 2019;21(6):558-565.
103. Goodrich JL, Wong BJ. Optimizing the soft tissue triangle, alar margin furrow, and alar ridge aesthetics: analysis and use of the articulate alar rim graft. *Facial Plast Surg.* 2016;32(6):646-655.
104. Sinno HH, Markarian MK, Ibrahim AMS, Lin SJ. The ideal nasolabial angle in rhinoplasty: a preference analysis of the general population. *Plast Reconstr Surg.* 2014;134(2):201-210.
105. Fagundes MS, Moreira AT, Tambara EM, Tenório SB, Fraga Rd, Hammerschmidt R. Objective assessment of surgical technique in rotation and nasal projection variation. *Braz J Otorhinolaryngol.* 2016;82(1):47-55.
106. Powell N, Humphreys B. *Proportions of the Aesthetic Face*. Stuttgart, Germany, New York: Thieme-Stratton; 1984.
107. Simons R. Nasal tip projection. Ptosis and supratip thickening. *Ear, Nose Throat J.* 1982;1061:452-455.
108. Bottino A, De Simone M, Laurentini A, Sforza C. A new 3-D tool for planning plastic surgery. *IEEE Trans Biomed Eng.* 2012;59(12):3439-3449.
109. Canfield - Vectra Face Sculptor. <https://www.canfieldsci.com/imaging-systems/vectra-m3-3d-imaging-system/>. Accessed December 21, 2020.
110. Lekakis G, Claes P, Hamilton GS 3rd, Hellings PW. Evolution of preoperative rhinoplasty consult by computer imaging. *Facial Plast Surg.* 2016;32(1):80-87.
111. Lekakis G, Hens G, Claes P, Hellings PW. Three-dimensional morphing and its added value in the rhinoplasty consult. *Plast Reconstr Surg Glob Open.* 2019;7(1):e2063.
112. Persing S, Timberlake A, Madari S, Steinbacher D. Three-dimensional imaging in rhinoplasty: a comparison of the simulated versus actual result. *Aesthetic Plast Surg.* 2018;42(5):1331-1335.
113. Willaert RV, Opdenakker Y, Sun Y, Politis C, Vermeersch H. New technologies in rhinoplasty: a comprehensive workflow for computer-assisted planning and execution. *Plast Reconstr Surg Glob Open.* 2019;7(3):e2121.
114. Toriumi DM, Dixon TK. Assessment of rhinoplasty techniques by overlay of before-and-after 3D images. *FacPlast Surg Clin North Am.* 2011;19(4):711-23, ix.
115. Topsakal O, Akbaş Mİ, Demirel D, et al. Digitizing rhinoplasty: a web application with three-dimensional preoperative evaluation to assist rhinoplasty surgeons with surgical planning. *Int J Comput Assist Radiol Surg.* 2020;15(11):1941-1950.