

## Quantifying outcomes of autologous fat transplantation in different facial deformities: A systemic review and meta-analysis

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Ma, XD<sup>1</sup>; Huang, JZ<sup>2</sup>; Long, X<sup>3</sup>; Wang, XJ<sup>4</sup>.**Corresponding author:**

Xuda Ma

pumc\_maxuda@student.pumc.edu.cn

**Author Affiliation:**

Peking Union Medical College Hospital.

**ADMINISTRATIVE INFORMATION**

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**Review Stage at time of this submission** - Completed but not published.

**Conflicts of interest** - None declared.

**INPLASY registration number:** INPLASY202370062

**Amendments** - This protocol was registered with the International Platform of Registered Systematic Review and Meta-Analysis Protocols (INPLASY) on 16 July 2023 and was last updated on 07 August 2023.

**INTRODUCTION**

**Review question / Objective** To review the outcomes of autologous fat transplantation for different facial deformities and quantitatively summarized these outcomes through a meta-analysis.

**Population**

Patients with facial deformities caused by various etiologies were included. This includes facial deformities caused by various congenital and acquired diseases. Patients with facial symmetry deformity.

**Intervention**

The intervention was treated with autologous fat grafting. Autologous fat grafting refers to surgical procedures performed using the Coleman method, and minor changes to the surgical steps could be included. Autologous fat grafting had to be the primary treatment in the included studies. Studies

in which other surgical operations were also performed were excluded. Studies in which autologous fat grafting was used as a complementary treatment were excluded. Studies in which autologous fat grafting was accompanied by other adjuvant components were excluded.

**Comparison**

Comparisons with other surgical procedures are not performed in this study.

**Outcome**

(1) Satisfaction: Satisfaction with surgery is the most important outcome variable in plastic surgery for facial deformities. Specifically, this includes patient satisfaction with the procedure, physician satisfaction with the procedure, and layperson satisfaction with the procedure. Satisfaction is assessed by scoring. (2) Retention: Autologous fat grafts are gradually absorbed over time. Retention over time is one of the critical outcomes. It refers to the amount of tissue retained at a given point in

the postoperative period compared to the time of initial injection. Retention is assessed by imaging or 3D scanning equipment. (3) Facial symmetry: The degree of symmetry of the face from side to side. It is assessed by imaging, 2D photos, or 3D scanning equipment. (4) Complications: Short-term postoperative edema and bruising were not included in the consideration of complications.

#### Study design

For inclusion, studies were required to have detailed descriptions of study outcomes, either objective or subjective, with objective outcome indicators including fat retention and facial symmetry and subjective outcome indicators including patient, physician, or layperson ratings of satisfaction with appearance. Reviews, case studies with fewer than five cases, conference abstracts, letters to the editor, animal studies and in vitro studies were not included.

**Condition being studied** The face is vital for its identification of the individual. Facial deformities can be caused by a variety of etiologies, including congenital, traumatic, and others. However, for plastic restoration of autologous fat grafting, the etiology of the disease is often overlooked in terms of its impact on treatment outcomes.

## METHODS

**Participant or population** Patients with facial deformities caused by various etiologies were included. This includes facial deformities caused by various congenital and acquired diseases. Patients with facial deformities caused by various etiologies were included. This includes facial deformities caused by various congenital and acquired diseases. Patients with facial symmetry deformity.

**Intervention** The intervention was treated with autologous fat grafting. Autologous fat grafting refers to surgical procedures performed using the Coleman method, and minor changes to the surgical steps could be included. Autologous fat grafting had to be the primary treatment in the included studies. Studies in which other surgical operations were also performed were excluded. Studies in which autologous fat grafting was used as a complementary treatment were excluded. Studies in which autologous fat grafting was accompanied by other adjuvant components were excluded. Patients with facial deformities caused by various etiologies were included. This includes facial deformities caused by various congenital and acquired diseases.

**Comparator** Comparisons with other surgical procedures are not performed in this study. Patients with facial deformities caused by various etiologies were included. This includes facial deformities caused by various congenital and acquired diseases.

**Study designs to be included** For inclusion, studies were required to have detailed descriptions of study outcomes, either objective or subjective, with objective outcome indicators including fat retention and facial symmetry and subjective outcome indicators including patient, physician, or layperson ratings of satisfaction with appearance. Reviews, case studies with fewer than five cases, conference abstracts, letters to the editor, animal studies and in vitro studies were not included.

**Eligibility criteria** Reviews, in vitro or animal studies, cadaveric anatomical studies, studies related to cosmetic AFT, and studies related to AFT in patients with acquired immunodeficiency diseases were excluded.

**Information sources** A systematic literature search was conducted in three medical databases, Embase, Medline All Ovid, and Web of Science, up to December 2022.

Search term for Web of science: TS=((craniofacial OR cranio-facial OR cranio OR cranial OR facial OR Hemifacial OR face) AND (atroph\* OR lipoatroph\* OR hypoplas\* OR aplas\* OR defect OR deformit\* OR deficienc\* OR malformation OR disorder OR asymmetr\* OR symmetr\* )) AND ((liposuct\* OR Lipectom\* OR ((fat OR Adipose-tissue\* OR lipo\*) NEAR/2 (graft\* OR micrograft\* OR injection\* OR transfer\* OR transplant\*)) OR lipolysis OR Lipoplast\* OR Lipofilling OR Lipotransfer\*))

Search term for Embase: (craniofacial:ab,kw,ti OR 'cranio facial':ab,kw,ti OR cranio:ab,kw,ti OR cranial:ab,kw,ti OR facial:ab,kw,ti OR hemifacial:ab,kw,ti OR face:ab,kw,ti) AND (atroph\*:ab,kw,ti OR lipoatroph\*:ab,kw,ti OR hypoplas\*:ab,kw,ti OR aplas\*:ab,kw,ti OR defect:ab,kw,ti OR deformit\*:ab,kw,ti OR deficienc\*:ab,kw,ti OR malformation:ab,kw,ti OR disorder:ab,kw,ti OR symmetry:ab,kw,ti OR asymmetry:ab,kw,ti OR asymmetr\*:ab,kw,ti OR symmetr\*:ab,kw,ti) AND (liposuct\*:ab,kw,ti OR lipectom\*:ab,kw,ti OR (((fat OR 'adipose tissue\*' OR lipo\*) NEAR/2 (graft\* OR micrograft\* OR injection\* OR transfer\* OR transplant\*)):ab,kw,ti) OR lipolysis:ab,kw,ti OR lipoplast\*:ab,kw,ti OR lipofilling:ab,kw,ti OR lipotransfer\*:ab,kw,ti)

Search term for Medline Ovid: ((craniofacial or cranio-facial or cranio or cranial or facial or Hemifacial or face) and (atroph\* or lipoatroph\* or hypoplas\* or aplas\* or defect or deformit\* or

deficienc\* or malformation or disorder or asymmetry or symmetry or asymmetr\* or symmetr\*).mp. and (Lipolysis/ or Lipectomy/ or (Adipose Tissue/ and (Transplantation/ or Cell Transplantation/ or Tissue Transplantation/)) or (liposuct\* or Lipectom\* or ((fat or Adipose-tissue\* or lipo\*) adj3 (graft\* or micrograft\* or injection\* or transfer\* or transplant\*)) or lipolysis or Lipoplast\* or Lipofilling or Lipotransfer\*).mp.).

**Main outcome(s)** (1) Satisfaction: Satisfaction with surgery is the most important outcome variable in plastic surgery for facial deformities. Specifically, this includes patient satisfaction with the procedure, physician satisfaction with the procedure, and layperson satisfaction with the procedure. Satisfaction is assessed by scoring. (2) Retention: Autologous fat grafts are gradually absorbed over time. Retention over time is one of the critical outcomes. It refers to the amount of tissue retained at a given point in the postoperative period compared to the time of initial injection. Retention is assessed by imaging or 3D scanning equipment. (3) Facial symmetry: The degree of symmetry of the face from side to side. It is assessed by imaging, 2D photos, or 3D scanning equipment. (4) Complications: Short-term postoperative edema and bruising were not included in the consideration of complications.

**Quality assessment / Risk of bias analysis** The risk of bias was assessed according to the study design: the Newcastle-Ottawa scale was used for cohort studies, the National Institute of Health Quality Assessment Tool for case series studies, and Jadad Scale for randomized controlled trials.

**Strategy of data synthesis** Single proportions (all outcomes are data of single proportions) are synthesised with R packages "meta" and "metafor" for meta analysis. Visual inspection of the funnel plot is used for publication bias. Heterogeneity is assessed using  $I^2$ , and values greater than 50% are considered to indicate significant heterogeneity.

**Subgroup analysis** The studies of facial deformities are divided into four categories according to the characteristics of disease development: (1) congenital deformities (including craniofacial microsomia and Treacher Collins syndrome), which are caused by abnormal embryonic development and manifest at birth with varying degrees of unilateral or bilateral atrophy of the first and second gill arches; (2) acquired atrophic deformities (including Parry-Romberg syndrome, localized scleroderma, and lupus erythematosus profundus), which are acquired and

associated with autoimmune abnormalities; (3) deformities caused by surgery and trauma; and (4) mixed deformities (some of the studies described the type of disease but analysed different types of deformities together, and some did not provide a detailed diagnostic description).

**Sensitivity analysis** Visual inspection of the funnel plot revealed no significant publication bias. Heterogeneity was assessed using  $I^2$ , and values greater than 50% were considered to indicate significant heterogeneity. Random effect model are used if there is significant heterogeneity.

**Language restriction** English.

**Country(ies) involved** China.

**Keywords** autologous fat transplantation, facial deformities, meta-analysis, Parry-Romberg syndrome, retention.

#### Contributions of each author

Author 1 - Xuda Ma.

Email: pumc\_maxuda@student.pumc.edu.cn

Author 2 - Jiuzuo Huang.

Email: hjz1983@126.com

Author 3 - Xiao Long.

Email: pumclongxiao@126.com

Author 4 - Xiaojun Wang.

Email: pumchwxj@163.com