EUROPEAN INTERNATIONAL JOURNAL OF MULTIDISCIPLINARY RESEARCH AND MANAGEMENT STUDIES

VOLUME03 ISSUE12
DOI: https://doi.org/10.55640/eijmrms-03-12-20 Pages: 112-118

THE EFFECTIVENESS OF AUTOTRANSPLANTATION OF FAT (LIPOFILLING) IN FACIAL CONTOURING

I.O. Nigmatov
Researcher Tashkent Medical Academy, Uzbekistan

ABOUT ARTICLE

Key words: auto transplantation of fat , lipofilling , lipograft .

Received: 04.12.2023
Accepted: 09.12.2023
Published: 14.12.2023

Abstract: The choice of material for contour-volumetric plastic surgery of soft tissues of the face is an urgent problem. Despite the large number of modern injectable filler implants, free autologous fat grafting (so-called lipofilling) remains the method of choice in the arsenal of most plastic surgeons. The high degree of graft resorption and the associated need to repeat procedures force us to search for ways to optimize the results of lipofilling. One of these directions is the enrichment of the lipograft with the vascular-stromal cell fraction (VSCF). Preliminary results of clinical testing confirm the safety of the method. However, for the widespread introduction of this cell-assisted surgical technology, additional research is needed to confirm its superior effectiveness and eliminate the possibility of unjustified complications of lipofilling.

INTRODUCTION

Lipofilling (in English literature “autologous fat grafting”) is a group of techniques based on autologous fat tissue transplantation. From the first experience of using autologous adipose tissue (AutoAT) presented in 1893 by Gustav Neber to the present day, lipofilling has been used primarily to correct areas with volume deficiency [1,15] . Traditionally, lipofilling is one of the leading methods for reconstructing maxillofacial deformities and aesthetic correction of deficiencies in the soft tissues of the face, as well as body contours [2].

The widespread use of lipofilling is due to the fact that Auto VT, unlike many commercial fillers, is completely biocompatible, naturally integrates into the tissues of one’s own body, and is also available

in sufficient quantities in most patients [3,16]. Currently, Auto VT is considered an ideal filler for tissue defects, since its administration is safe and is accompanied by a minimum number of complications [4,14] .

The boom in the use of lipofilling is due, on the one hand, to the widespread use of liposuction, and on the other, to the identification of such properties as improving skin quality, anti-aging and regenerative effects [5]. Over the past decade, lipofilling has become the method of choice in reconstructive and aesthetic surgery [7-13] . It is used for facial rejuvenation and beauty, breast enlargement, breast reconstruction after mastectomy, buttock enlargement, correction of lower leg contours, contour plastic surgery of the anterior abdominal wall, treatment of scars, burns, trophic ulcers, HIV associated lipodystrophy, elimination of deformities and correction of soft tissue defects, treatment of complications of endoprosthetics and radiation injuries [1, 6].

Results of the study and their discussion

Morphological features of transplants used in comparison groups. In both groups, the immediate postoperative period was accompanied by moderate swelling and minor interstitial hemorrhages in the donor and recipient areas. The observed adverse events were consistent with those expected and, in most cases, were mild and short-lived. The appearance allowed a return to social activity on days 3–7 after the intervention. Moreover, when using VSCF, undesirable traces of facial surgery regressed 1–2 days earlier than when using traditional lipofilling. Prolonged edema (more than 1 month) was a cause of concern in 11 patients (10.5%) from the OG and in 22 patients (22.4%) from the CG. In 2 patients (2%) from the CG, persistent hyperpigmentation of the skin over the lipofilling area was observed. There were no cases of formation of hematomas, cysts, granulomas, erosions, necrosis, infectious complications or allergic reactions during the observation period.

6 months after surgery, most patients experienced a pronounced clinical result, consisting of tissue growth in the injection areas, restoration of the macrorelief of problem areas and general contours of the face. The results of contour-volume plastic surgery in the comparison groups, assessed using the General Aesthetic Improvement Scale (GAIS), are presented in the form of a diagram in Figure 2.

The average score when assessed by a doctor was 2.0±0.1 in the group, which was significantly higher than the CG score – 1.4±0.1 ($p \leq 0.01$). The best results were obtained when contour-volume plastic surgery was performed to correct age-related changes in the face (average GAIS score in the MG – 2.5±0.1, in the CG – 1.6±0.1, $p \leq 0.01$.). The most difficult cases for correction were cases of restoration of the contours of the soft tissues of the face after injuries and operations (average GAIS score in the MG

– 1.4±0.1, in the CG – 1.2±0.1, p≥0, 05). Such patients often encountered unfavorable conditions for the engraftment of adipose tissue in the area of defects: low capacity of recipient zones, pronounced

Evaluation of the results of contour-volumetric facial plastic surgery in comparison groups using the GAIS scale. a, b – as assessed by the doctor, c, d – as assessed by the patients

scarring, poor blood supply. In such cases, the advantages of using HFSC-enriched lipograft were evident when assessing the results of repeated lipofilling (average GAIS score in the MG – 2.3±0.1 with n=27; in the CG – 1.5±0.1 with n=32; p ≤0.01), as well as by reducing the frequency of procedures to achieve an optimal result (on average, procedures performed per patient: in the MG – 1.7±0.1 (n=48), in the CG – 2 .1±0.1 (n=39); p≤0.01). The average score when assessing the results of the operation by patients coincides with that when assessed by a doctor – 2.0 ± 0.1 in the OG and 1.4 ± 0.1 in the CG (p≤0.01).

MRI scans 1, 3 and 6 months after transplantation in CG patients reveal hyperintense inclusions in the lips, the intensity of which is leveled out in the fat suppression mode, which allows these inclusions to be identified as areas of transplanted adipose tissue. In the OG, hyperintense inclusions are also noted on MRI sections of the lips at all follow-up periods, but unlike cases with pure fat transplantation, they are partially preserved in the fat suppression mode. This phenomenon can be explained by the increased content of stromal elements in the enriched lipograft, which has different magnetic resonance properties than native adipose tissue rich in adipocytes. Taking into account the MRI data, the autologous fat transplantation we performed, both in its native form and in combination with HFSC, can be considered successful.

Quantitative analysis of MRI data showed that initially the average volume of the lip model in the comparison groups did not have significant differences (V0 in the OG – 9.18±0.13, in the CG – 9.37±0.14 cm3 ; p >0.05). The postoperative dynamics of the added volume (AV) index in the comparison groups is presented in Figure 3. In the period from 1 to 3 months, graft resorption is observed in both groups, however, this process is less pronounced when VSCF is included in the lipograft: in the CG, the VA index over these 2 months it decreased by an average of 25.9% (p<0.01), and in the OG only by 6.3% (p>0.05). When compared between groups 3 months after transplantation, the DO indicators showed no significant difference (p>0.05). In the subsequent period, from 3 months to six months, there are fundamental differences in the nature of the dynamics of DR indicators depending on the composition of the graft: in the CG the studied indicator continued to fall and decreased by another 13.4% (p = 0.05),

in the CG , on the contrary, increased by 32.6% ($p<0.01$). When compared between groups at the end of the six-month observation period, the average DO in the MG was 40.5% higher than in the CG ($p <0.01$).

Taking into account that during lipofilling, fat is distributed along the entire length of the lips and the analyzed area (within the standardized boundaries of the model) accounts for about 75% of the original graft volume, it can be stated that in the CG, from those transplanted to the area of the boundaries of the 3D model After six months of 3.6 ml of native fat, 0.84 ml (23%) remained in the lips, and in the OG, out of 3.2 ml of fat enriched with HFSC, 1.18 ml (37%) remained.

The results of the study indicate that there are no additional clinical risks of lipofilling when enriching the graft with HFCS. The issue of safety of cell technologies is currently a cornerstone issue. The cell-assisted technology used in the work is based on the use of autologous cellular material, isolated ex tempore in sufficient quantities from an easily accessible source - adipose tissue, which completely eliminates the disadvantages associated with the introduction of allogeneic cells or the cultivation of one's own [1, 7 , 14]. An important advantage of the method of contour-volumetric facial plastic surgery being tested is a shorter rehabilitation period. It is known that the perivascular and endothelial progenitor cells present in the HFSC stimulate neoangiogenesis and revascularization and thus, at an early stage, can contribute to the restoration of graft perfusion and rapid regression of perifocal edema [3, 8, 13]. Disfiguring deformations and even small aesthetic defects in the affected tissues of the facial area often lead to social maladaptation of the individual and can provoke serious psychopathological disorders [5, 6]. Therefore, patient satisfaction with the results of correction, no matter how subjective it may be, is the decisive goal of the treatment. Patient satisfaction with the results of the treatment (GAIS score≥2) was 72% in the group and 34% in the control group, which indicates the significantly superior effectiveness of our proposed approach compared to the effectiveness of traditional lipofilling.

It is known that after free fat tissue transfer, only a small part of adipocytes manage to receive adequate revascularization and remain viable. The main part of the fat microflap undergoes dynamic remodeling, which is based on multidirectional processes: the death of hypoxia-sensitive adipocytes with their subsequent resorption, on the one hand; regeneration of adipose tissue from the most viable stromal/stem cells – on the other [10]. The predominance of cell regeneration processes over the processes of their death and resorption can explain the increase in tissue volume observed in MG patients from the 3rd to the 6th month. The organization of this study using a single-difference methodology provides the basis for assessing the changed condition (adding HSCF to the graft composition) and the resulting result (tissue regeneration) as a causal relationship. Probably, the stromal/stem cells, precursors of smooth muscle and vascular endothelial cells, fibroblasts,

lymphocytes and a wide range of growth factors and cytokines produced by them stimulate the processes of reparative regeneration of the transplanted tissue. Due to their high facial activity, lips are traditionally one of the areas of the face that is difficult to correct [9, 11]. Therefore, the result we obtained—increasing the efficiency of lip lipofilling by 1.5 times—is significant and confirms the feasibility of using VSCF for contour plastic surgery of soft facial tissues, including in the most complex clinical situations.

Thus, enriching the lipograft with HSCF helps to optimize the results of lipofilling regarding adipocyte survival and the associated volumetric effect, and also probably increases the regenerative therapeutic potential of adipose tissue transplantation (wound healing, angiogenic, etc. properties).

Thus, the results of the study indicate the safety of using an HFSC-enriched fat graft for contour plastic surgery of the soft tissues of the face, and the absence of clinical risks in addition to those present with traditional lipofilling.

Contour plastic surgery using a fat graft enriched with HFSC is characterized by an easy and short rehabilitation period: unwanted traces of surgery on the face regress 1–2 days earlier than when using traditional lipofilling; the risk of developing prolonged edema is two times less.

CONCLUSIONS

The use of a fat graft enriched with HFSC significantly increases the effectiveness of contouring compared to traditional lipofilling technology, which is expressed by higher scores for the result of a single correction on the scale of general aesthetic improvement (average GAIS score 2.0±0.1 versus 1.4 ±0.1, with $p \leq 0.01$), reducing the frequency of interventions to achieve an optimal result in the most difficult clinical situations (average number of operations for the correction of post-traumatic and postoperative soft tissue defects 1.7±0.1 versus 2.1±0.1 per patient, with $p \leq 0.01$). The introduction of VSCF into the fat graft has a significant effect on the processes of dynamic remodeling of the transplanted adipose tissue: in the period from 1 to 3 months, the resorption of the graft slows down, and in the subsequent period, from 3 months to six months, an increase in volume is observed fabrics. The effectiveness of lip lipofilling (according to MRI data) increases from 23% to 37%.

REFERENCES

1. Y usupov Sh. Sh., Boymuradov Sh. A., Narmurotov BK Reconstruction of the temporomandibular joint and branches of the lower jaw using a modeled individual titanium implant // Health, demography, ecology of the Finno-Ugric peoples. – 2020. – No. 3. – pp. 70-72.
2. Yusupov, Sh. Sh., Sh. A. Boymuradov, and B. K. Narmurotov. "RECONSTRUCTION OF THE TEMPOROMANDibular JOINT AND BRANCH OF THE MANDIBLE USING A SIMULATED CUSTOM TITANIUM IMPLANT." Health, demography, ecology of Finno-Ugric peoples 3 (2020): 70-72.
3. Yusupov, Sh. Sh., Boymuradov, Sh. A., & Narmurotov, B. K. (2020). RECONSTRUCTION OF THE TEMPOROMANDibular JOINT AND BRANCH OF THE MANDIBLE USING A SIMULATED CUSTOM TITANIUM IMPLANT. Health, demography, ecology of the Finno-Ugric peoples , (3), 70-72.
4. Yusupov Sh. Sh. et al. SURGICAL TREATMENT OF FRACTURES OF THE LOWER WALL OF THE ORBIT USING 3D TECHNOLOGIES.
5. Yusupov , Sh . Sh ., et al. "SURGICAL TREATMENT OF FRACTURES OF THE LOWER WALL OF THE ORBIT USING 3D TECHNOLOGIES." 55.
6. Yusupov, Sh. Sh., Boymuradov, Sh. A., Narmurotov, BK, Nigmatov, IO, Karimberdiev, BI, Shukhratova, MM, & Ruzikulova, M. Sh. SURGICAL TREATMENT OF FRACTURES OF THE LOWER WALL OF THE ORBIT USING 3D TECHNOLOGIES.
7. Yusupov Sh. Sh. et al. AN INTEGRATED APPROACH TO SURGICAL TREATMENT OF PATIENTS WITH ORBITAL WALL FRACTURES IN COMBINED INJURIES.
8. Yusupov , Sh . Sh ., et al. "INTEGRATED APPROACH TO SURGICAL TREATMENT OF PATIENTS WITH ORBITAL WALL FRACTURES WITH COMBINED INJURIES." thirty.
9. Yusupov, Sh. Sh., Narmurotov, BK, Karimberdiev, B.I., Shukhratova, M.M., & Ruzikulova, M. Sh. AN INTEGRATED APPROACH TO SURGICAL TREATMENT OF PATIENTS WITH ORBITAL WALL FRACTURES DURING COMBINED INJURIES.
10. Narmurotov BK PECULIARITIES OF THE FUNCTIONAL STATE OF THE SALIVARY GLANDS IN THYROID PATHOLOGY //European International Journal of Multidisciplinary Research and Management Studies. – 2023. – T. 3. – No. 07. – S. 189-192.
11. Narmurotov, BK "PECULIARITIES OF THE FUNCTIONAL STATE OF THE SALIVARY GLANDS IN THYROID PATHOLOGY." European International Journal of Multidisciplinary Research and Management Studies 3.07 (2023): 189-192.
12. Narmurotov, B. K. (2023). PECULIARITIES OF THE FUNCTIONAL STATE OF THE SALIVARY LANDS IN THYROID PATHOLOGY. European International Journal of Multidisciplinary Research and Management Studies , 3 (07), 189-192.

13. Yusupov S. et al. OUR EXPERIENCE IN SURGICAL TREATMENT OF PATIENTS WITH INJURIES OF THE ORBITAL FLOOR WITH COMBINED INJURIES OF THE FACIAL SKELETON //International Journal of Medical Sciences And Clinical Research. – 2023. – T. 3. – No. 04. – pp. 80-87.

14. Yusupov, Shokhrukh , et al. "OUR EXPERIENCE IN SURGICAL TREATMENT OF PATIENTS WITH INJURIES OF THE ORBITAL FLOOR WITH COMBINED INJURIES OF THE FACIAL SKELETON." International Journal of Medical Sciences And Clinical Research 3.04 (2023): 80-87.

15. Yusupov , S., Boymuradov , S., Narmurotov , B., Iminov , K., Qurbonov , Y., & Shukhratova , M. (2023). OUR EXPERIENCE IN SURGICAL TREATMENT OF PATIENTS WITH INJURIES OF THE ORBITAL FLOOR WITH COMBINED INJURIES OF THE FACIAL SKELETON. International Journal of Medical Sciences And Clinical Research, 3(04), 80-87.

16. Yusupov Sh. Sh. et al. AN INTEGRATED APPROACH TO SURGICAL TREATMENT OF PATIENTS WITH ORBITAL WALL FRACTURES IN COMBINED INJURIES.