



Clinical outcomes of patients with prominent nasolabial folds corrected by the technique: Dermo-fascial detachment and fat grafting

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Summary *Background:* Prominent nasolabial folds (NLFs) due to ageing are a major aesthetic concern among Asian women. The main causes are drooping of the cheek mass, depressions (folds) and dermal attachments. We have conducted a study to analyse the long-term outcomes of the conventional dermo-fascial detachment and fat grafting technique.

Methods: A total of 209 patients with NLFs of different severity were included in the study. Dermo-fascial detachment was used to completely dissect the attachments; then, the space was filled with fat grafts. The outcomes and related factors were analysed statistically based on the classification of NLF grades.

Results: The average operating time was 28.4 min, and no postoperative infections were found. A high improvement ratio was noted: at the 3-month, 1-year and 2-year follow-up consultations; the improvement ratio was about 100%, $97.4 \pm 2.6\%$ and $66.7 \pm 9.2\%$, respectively. At the 2-year follow-up, the improvement ratio of the severe grade group ($71.4 \pm 10.1\%$) remained higher than that of the mild grade group ($50.0 \pm 22.3\%$). Six cases relapsed to the original grade (15.4%), and two cases were worse after 2 years (5.1%). No statistical correlation between age and the grade of the condition was determined ($p = 0.746$). Total filling amounts with fat grafts made no statistical difference to the outcomes of the long-lasting group (1.93 ± 0.26 cc) and the non-long-lasting group (1.84 ± 0.19 cc) ($p = 0.435$). *Conclusion:* Dermo-fascial detachment and fat grafting is a safe and reliable technique for the correction of prominent NLFs with high improvement ratios, minimal morbidities and long-lasting outcomes.

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Nasolabial folds (NLFs) are one of the main hallmarks of ageing. Anatomical and histological studies of NLFs reveal that 'fold muscle' bundles or fibrous strands arise from the development of superficial fascia underneath the dermis. The compartmentalised fat is positioned into discrete anatomical units by the septum between nasolabial fat and medial cheek fat.¹⁻⁷

The technique (dermo-fascial detachment and fat grafting using a pickle-fork cannula) has been widely used to improve the prominent NLFs.⁸ The aetiologies of prominent NLFs, which are the keys to successful facial rejuvenation surgery, are soft-tissue drooping, depressions (folds) and facial overexpressions. First, ptosis of the overlying cheek mass (fat and skin) contributes to deepening of NLFs with age. The problem can be resolved by facelift procedures and mid-face liposuction.⁹⁻¹³ Second, depressions (folds) are caused primarily by the sunken mid-face bony structure, which is more obvious in malocclusion class II (snag) patients. The conventional solution involves filling the depressions with artificial fillers or lipofilling.¹⁴⁻¹⁸ Third, facial overexpressions always cause features of ageing. Emotional changes may gradually deepen NLFs over a long period, even in people with normal facial expression activity. Using botulinum toxins to reduce the strength of facial animations may slow down the deterioration.^{19,20} Its effect is not satisfactory. No single procedure can totally eliminate prominent NLFs. Successful NLF treatments are strongly correlated with the cause-and-effect relationships. The dermo-fascial detachment combined with autologous fat grafting is a well-established aesthetic technique, which resolves two of three aetiologies of prominent NLFs. However, the long-term outcome of the technique is rarely studied.

In recent years, the convenience of artificial fillers and botulinum toxins has led to the widespread use of minimally invasive procedures. Doctors, who are not plastic surgeons, often advise patients to have injections of artificial fillers for the purpose of aesthetic augmentation. They may emphasise the risks and 'bad' results of some kinds of NLF plastic surgery. For the same reason, some plastic surgeons suggest surgical procedures as a secondary option. This trend not only has a long-term influence on the perceptions of the media and the general public, but also has an indirect impact on the aesthetic market of plastic surgeons. Therefore, NLF operations should be thoroughly assessed and improved to promote the advantages of plastic surgery for rejuvenation.

We investigate the long-term effects of this popular technique to help us determine how long the treatment of NLFs will last or whether there will be a relapse after surgery.

Patients and methods

Patient selection and evaluation

Between January 2004 and May 2008, 209 patients underwent NLF operations. All the patients satisfied the inclusion criterion, that is, subjective aesthetic dissatisfaction, even patients with mild NLFs. Of those, 69.2% completed the whole follow-up programme, and the remainder attended

two of the three follow-up consultations (3 months and 1-year). The age range of the patients was 35-61 years, and the mean age was 46.7 years. A total of 24% patients underwent combined procedures, including liposuction and fat grafting (for cheek depressions) at the same time. None of the patients had a history of NLF-related operations, including facelifts and filler injections (e.g., hyaluronic acid and fat grafts). The severity of our NLF grading system is classified into mild ($n = 70$) and severe ($n = 139$) grade. The difference between both grades is length of the nasolabial fold: full-length involvement is graded as the severe grade and shorter than the half-length involvement is graded as the mild grade. Clinical preoperative and postoperative grading assessments are conducted over the worst side of the NLFs at 3 months, 1-year and 2 years. Adverse events were also recorded.

An outcome was considered a subjective 'improvement' if there was a disappearance of prominent NLFs. The improvement ratio is defined as the number of improved cases that fit the above improvement criterion divided by the total number of cases. Results were defined as 'long-lasting' if the improvement was maintained at the 2-year follow-up consultation.

Operating techniques

The patient was initially placed in the supine position for liposuction, followed by the dermo-fascial detachment and fat grafting procedure under local anaesthesia. However, some patients in the study requested that body sculpture procedures be performed under general anaesthesia so that fat grafts could be harvested at the same time. First, the Coleman technique was introduced to collect fat cells into a sterilised syringe. The donor site is selected by the patient. The amount of harvested adipose tissues is 5 cc, which is above the desired amount (2 cc). The fat grafts are centrifuged to discard the unusable parts. Then, a small NLF pickle-fork cannula (dissector) is used to separate the dermo-fascial attachment via the puncture incision (about 0.1 cm), which is made at the lowest point of the nasolabial folds, as shown on the left-hand side of Figure 1. The dissection or separation starts along the nasolabial fold from the ala-cheek junction to the lowest portion with a 0.5-cm-wide dissection. In addition, the smallest curette instrument is inserted to further clean up all residual attachments underneath the dermis of the NLFs. Figure 1b showed the schematic illustration of the technique underneath the skin.

Each fat graft is packed into a 3-cc syringe and injected into the nasolabial fold in order, as shown on the right-hand side of Figure 1. If cheek and subzygomatic depression need to be corrected at the same time, fat grafting is performed via the same incision wound. No severe ecchymosis was noted during the recovery time (Fig. 2). The most important postoperative advice given to patients is that they should avoid massaging the operative area and making facial expressions as much as possible.

Statistical analysis

All statistical calculations were performed using SPSS 15.0. The correlations between grades and ages were

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