Repair of Ptosis Using Frontalis Muscle and Fascia Lata: A 20-Year Review

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SUMMARY

The results of an analysis of the surgery ("Repair of Ptosis using Frontalis Muscle and Fascia Lata") carried out on 316 lids is presented. The main indication for this operation is a large congenital ptosis with minimal levator function.

Conclusions from the study indicate that autogenous fascia is an ideal tissue for lid suspension, and is better than stored fascia. Stored fascia does present some problems but is useful in small children or when the patient does not want a scar on the leg. Bilateral repair for unilateral ptosis is recommended for symmetrical results. The best ages for surgery is between 3-1/2 and 6 years of age, as these young corneas rapidly adapt to the exposure problems. It is very important to check the corneal sensation before carrying out the surgery. When this operation is done on older patients with acquired ptosis, e.g. ptosis associated with myasthenia gravis, corneal exposure problems frequently result.

In 1956 I presented a paper at the American Academy of Ophthalmology and Otolaryngology entitled "Repair of Ptosis Using Frontalis Muscle and Fascia Lata" which was later published.¹ The purpose of this paper is to present an analysis of the surgery done in the intervening 20 years.

Fascia repair was carried out on 316 lids (104 bilateral and 108 unilateral). One hundred and twenty-seven of these lids were repaired with stored fascia (40 bilateral and 47 unilateral).

Four patients had a ptosis repair using fresh human fascia lata from another child. In each case, enough fascia was removed from one child when the ptosis was being repaired and it was kept in saline until the end of this operation and then used in a second child.

In one patient with bilateral ptosis, stored human fascia was used in one lid and stored bovine fascia in the other.

In another patient with bilateral ptosis, autogenous fascia was used in one lid and stored fascia in the other.

SURGICAL INDICATIONS AND TECHNIQUE

The main indication for surgery is a large

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congenital ptosis with minimal or no levator function. If there is less than 5-6 mm of lid excursion when the frontalis muscle is splinted with a finger, then a levator resection is not adequate (Figure 1).

The technique has been essentially the same since that described in 1956 with minor modifications1 (Figure 2). Either stored or autogenous fascia are used. Ophthalmologists should take their own fascia.

There are three fascia strippers (Wilson, Masson, and Crawford). I prefer my own, manufactured by the Storz Company. It has the advantage that it is the smaller instrument to push up under the skin of the leg, and if the blade is kept sharp, a 10 mm wide strip of fascia can easily be obtained. There are centimeter markings on the fascia stripper and the required minimum length is 10 cm. The operation is made easier if the strip taken is 12 cm long.

The lid is divided into thirds and incisions made in the center of each third about 2 mm above the lash line. The lid is raised with forceps to the desired position and the site of the brow incisions marked with methylene blue. A line is drawn at right angles to the lid border from a point midway between the incisions. The forehead incisions are made 7 mm above the brow. The central brow incision is placed between the two incisions above them.

Two fascia strips are used for each eyelid.
FIGURE 2: Repair of ptosis with fascia lata. (A) Lid is divided into thirds and incisions made in each third, 2 mm above lash line. Forehead incisions are made 7 mm above the brow on a line perpendicular to the lid border when the lid is held up with forceps in the desired position. The central forehead incision is midway between the other forehead incisions and slightly above them. (B, C, D) Two fascia strips are placed in each eyelid under the skin and in the orbicularis muscle with a Wright fascia needle. (E) Ends of the fascia are tied in a double knot with a piece of 3-0 chromic catgut tied over the knots. (F) An end of each piece of fascia is brought under the skin and out through the central forehead incision. (G) An ellipse of skin is removed from every unilateral case and most bilateral cases.
and they are placed under the skin and in the orbicularis muscle with a Wright fascia needle.

The ends of the fascia are tied in a double knot after a piece of 3-0 chromic catgut is laid beneath them.

In experimental work done with rabbits, it was found that these knots were ensheathed in a thin covering of fibrous tissue by the end of one week. This sheath keeps the knot from coming apart.

Sex chromatin of the nuclei (Barr bodies) (Figure 3) of the fibroblast was used as an index of the source, whether graft or host, to determine the fate of fresh autographs.

When irradiated fascia is used, the cells, dead at the time of transfer, appear to be replaced by infiltrating fibroblasts from the host. When fascia from male rabbits was implanted into female rabbits and examined at the end of three weeks, tissue culture showed that the fibroblasts grew well and macrophages and round cells from the host were growing into the grafts.

RESULTS

When fresh fascia was used, only one infection in a lid was encountered which cleared up quickly on systemic antibiotics. When stored fascia was used, brow reactions occurred in 10 patients (Figure 4). This consisted of swelling and redness of the tissues around the knot in the forehead and in some cases a sterile abscess occurred. In bilateral cases, these reactions always occurred in both lids and in most cases if the wound was opened and cultured, no bacterial growth occurred. It was found that if these wounds were left alone and not opened, the reaction would gradually subside with no impairment of the results.

It was also found that 14 lids (five bilateral and four unilateral) began to droop after three months and autogenous fascia was required for a repeat operation. This is approximately 10 percent of patients. In approximately half these cases an attempt was made to do a biopsy on the stored fascia in the lid and we concluded that the fascia had disappeared. It had probably been absorbed. There were an additional five cases where the lids did begin to droop but the final results was satisfactory and no further surgery was done.

![FIGURE 3: Barr body.](image-url)
There were four cases where fresh fascia was used that had been taken from another child who had had a fascial repair of ptosis. All of these cases obtained a good result with no deterioration over the next 10-year period.

In one patient stored bovine fascia was used in one lid and stored human fascia in the other lid. Within two months the lid repaired with the bovine fascia showed a complete return of the original ptosis whereas in the other lid a good result persisted.

LID SUSPENSION FOR PTOSIS DUE TO OTHER CONDITIONS

A. After the Removal of Lid Tumors (Hemangioma, Lymphangioma, Neurofibroma). Fascia lata was used in three patients where a hemangioma had been removed by the plastic surgeons with damage to the levator muscle (Figure 5). There was one patient who had similar experience after the removal of a lymphangioma. The results were satisfactory considering that these lids are thickened and the usual fascial suspension results are difficult to obtain.

In recent years, plastic surgeons have not been removing hemangiomas or lymphangiomas since they gradually regress in size and in many cases disappear.

B. Blepharophimosis with Ptosis. (Figure 6) Sixteen patients had fascia used to repair their ptosis. All obtained satisfactory results. The appearance of these children was improved but the results are not spectacular because of the narrow width of the lid, limiting the elevation.

C. After Failed Levator Resection. There were six cases where levator resection had been done with unsatisfactory improvement. Subsequent fascia repair gave good results. Berke* had previously noticed that a better result was obtained with fascia after a failed levator resection than in a lid where no previous surgery had been done. This also was my observation.

D. The Use of Fascia Lata in Third Nerve Paralysis. The results of using fascia lata to elevate the lids in two patients was poor because of the position of the eye. It was better in a third patient with congenital third nerve palsy. The eye was straightened first by resecting the lateral rectus, resecting the medial and using the superior oblique as a medial rotator. The trochlea was cut and the superior oblique

FIGURE 5: (Upper) After removal of hemangioma which resulted in damage to the levator muscle. (Lower) After fascia lata repair of ptosis.

FIGURE 6A: Blepharophimosis with ptosis.                     FIGURE 6B: After bilateral fascia lata repair.
attached to the upper border of the medial rectus.

E. Bilateral Repair for Unilateral Ptosis. Nine patients had this surgery. In all cases the levator muscle on the normal side was not cut but the fascia was placed in the lid to restrict its downward movement as suggested by Callahan2 (Figure 7). In all of these patients the parents were pleased with the result since the lagophthalmos and lid position were more symmetrical. I now recommend bilateral surgery for all unilateral ptosis patients. Some parents will only permit surgery to the affected lid. The lack of symmetry in unilateral repair is demonstrated in Figure 5.

F. Congenital Fibrosis Syndrome. This consists of strabismus fixus with ptosis (Figure 8). The eyes are fixed in a downward position. We all hesitate to correct ptosis with brow suspension in patients with no Bell’s phenomenon. Eleven patients with this condition had their ptosis corrected with fascia. Their corneas all became accustomed to the corneal exposure. The patients under five years of

FIGURE 7A: Unilateral ptosis (preoperative).

FIGURE 7B: Bilateral repair of unilateral ptosis with fascia lata.
result would have been obtained if fascia had been placed in both upper lids. Levator resection gives the best results in most cases as the jaw-winking does diminish as these children grow older.

**H. Myasthenia Gravis.** Fascia lata was used to repair bilateral ptosis in a child under five years of age with this disease. The result was satisfactory with no later corneal problems (Figure 9).

My experience with three other patients, the youngest which was 40 years of age, showed corneal exposure problems after levator resection of one lid. It was necessary to tape the lower lids up during sleep for approximately one year. Thus, unless the patient is very young it would appear that fascia repair frequently causes serious corneal exposure problems.

**I. Ocular Myopathy.** One patient with ocular myopathy had bilateral repair with age had very little difficulty, whereas the older patients required various periods of taping their lids closed at night.

**G. Marcus-Gunn Syndrome.** Fascia lata was used to suspend lids in five patients with this condition after cutting the levator muscle. The results after these operations showed some improvement but a better

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**FIGURE 8A:** Congenital fibrosis syndrome.

**FIGURE 8B:** After bilateral fascia lata repair.

**FIGURE 9A:** Five-year-old girl with Myasthenia Gravis.

**FIGURE 9B:** After bilateral repair of ptosis with fascia lata.
stored fascia and obtained an excellent result. There was some absorption of the fascia with partial recurrence of the ptosis but no further surgery was done. Two patients, aged 43 and 57, with oculo-pharyngeal-myopathy had bilateral repairs with stored fascia. Both patients developed corneal exposure problems. The 43-year-old patient required taping of the eye for sleeping for two months. The 57-year-old patient required taping for over a year and even then had punctate corneal staining with periodic pain and discomfort. Two other patients, one age 29 years and the other 43 years, with oculo-limb-myopathy had a satisfactory result with no complications.

COMPLICATIONS

Exposure Keratitis: In this series there were seven cases that experienced corneal problems.

The first patient, a 64-year-old man, developed exposure keratitis after a fascia repair of a congenital ptosis which had increased as he grew older. His lids were later lowered by cutting the fascia and inserting a scleral graft. The second patient, a 57-year-old man, developed an exposure keratitis after a unilateral repair of ptosis for oculo-pharyngeal-myopathy. This was finally controlled after a year by taping his lids at night. The third patient, a 12-year-old girl, having had a fascia repair after removal of a neurofibroma developed an exposure keratitis. This cleared up after one month. The next two patients, a three- and four-year-old, had a unilateral repair of congenital ptosis. Both children developed punctate keratitis lasting several months which cleared up with no further trouble. The sixth patient, a five-year-old girl, with congenital fibrosis syndrome developed a corneal ulcer and later a corneal leukemia. It was later found that this girl had poor corneal sensation in both eyes. Two patients had similar problems after levator resection and later were found to have insensitive corneas. The last patient, a 43-year-old man, with oculo-limb-myopathy had a bilateral repair of ptosis with stored fascia. He developed exposure keratitis which persisted although he has learned to live with it by taping his lids up at night.

Excess Skin: In most cases of unilateral repair of ptosis with fascia lata, the excess skin hangs down over the lashes and has to be removed. Consequently, an ellipse of skin should be removed in every unilateral case and in most bilateral cases (Figure 2G).

Under and Overcorrection: No cases of overcorrection were encountered and the greatest difficulty was to get the lid high enough with unilateral repair.

Other Complications: Entropion developed in one patient, because the fascia was placed too deeply (Figure 10). It was repaired by cutting the fascia and later in-

FIGURE 10: Entropion which resulted when fascia was placed too deeply.
serting more fascia in the proper position.
There have been no patients with
distortion or loss of lashes from the placing
of fascia.
There were two patients with prolapsed
conjunctiva. Both of these patients had had
fascia repair after the removal of a neuro-
fibroma. In both patients this was corrected
by placing a piece of stored fascia up
through the upper fornix and bringing it out
through an incision in the brow and tying it.

CONCLUSIONS

1) The operation should only be used
when there is limited levator function. 2) There
are different methods of placing the
fascia, but with the method described, a
good contour to the upper lids may be
obtained. 3) Autogenous fascia is an ideal
tissue for lid suspension. 4) Autogenous
fascia is better than stored fascia. The
latter presents some problems, such as, the
brow reactions and the occasional
absorption of the fascia, but it is very useful
in small children where the leg is too short
to obtain fascia. It is also useful in those
cases where the patient does not want a
scar on the leg. When autogenous fascia is
used, the brow incisions are closed with 6-0
plain gut but when stored fascia is used,
these incisions are closed with 6-0 Dexon
as they may open up if there is a brow
reaction. 5) Although we must know
whether a Bell’s Phenomenon is present, it
is more important to know about the
corneal sensation. Patients with
diminished corneal sensitivity frequently
have corneal exposure problems. 6) Bilateral repair for unilateral ptosis gives
better symmetrical results. 7) Removal of
an ellipse of skin from the lid in every
unilateral and most bilateral cases is
desirable. 8) The proportion of corneal
problems increases with age. Most
children under five years of age have no
corneal problems with this operation
unless they have an insensitive cornea. 9) It
would thus appear, that the operation
should be done after age three and a half
years, when the leg is long enough to
obtain adequate fascia and before five or
six, so that the young corneas may become
accustomed to the corneal exposure. 10) Fascia repair of the ptosis occurring with
myasthenia gravis frequently results in
corneal exposure problems.

REFERENCES

1. Crawford JS: Repair of ptosis using frontalis
muscle and fascia lata. Tr Am Acad Ophth
60:672, 1956.
2. Callahan A: Correction of unilateral
blepharoptosis with bilateral eyelid

ANNOUNCEMENT

The New Jersey Academy of Ophthalmology and Otolaryngology will hold its Annual
Scientific Meeting at the Robert Treat Hotel, Newark, New Jersey, on Wednesday,
The program will be on the Macula. The faculty will include Robert Bergen, M.D.;
Francis Cangemi, M.D.; Donald Green, M.D.; John Leaman, M.D.; and Joseph Patti, M.D.
Guest Speakers are: William Tasman, M.D., Philadelphia; August F. Deutman, M.D.,
Nijmegen, Netherlands, Holland; William E. Benson, M.D., Philadelphia; Robert J. Brock-
hurst, M.D., Boston; Harold F. Spalter, M.D., New York; Arnall Patz, M.D., Baltimore;
J.W. McMeel, M.D., Boston; and William Annesley, M.D., Philadelphia.
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