Effectiveness of primary correction of traumatic telecanthus

M. A. W. Merkx1, H. P. M. Freihofer1, Wilfred A. Borstlap1, Martin A. van 't Hoff2

Abstract. To assess the aesthetic and functional results of primary treatment of telecanthus in patients with naso-orbito-ethmoidal fractures, the results in 36 patients were evaluated in a retrospective study. Twenty had double-sided telecanthus: 13 required an indirect technique of canthopexy and seven a direct technique. Sixteen had unilateral telecanthus, of whom six were treated by the indirect and 10 by the direct technique. The intercanthal distance (ICD) was measured directly postoperatively and more than 12 months after reconstruction. The late ICD after application of the direct technique was nearly 3 mm smaller (ANOVA, P≤0.02, mean 34.3 mm) and yielded 2 mm less relapse (ANOVA, P≤0.02) as compared with the indirect technique. Delayed or late-primary treatment showed a significantly higher frequency of epiphora (chi-square test, P<0.05). Early primary treatment of traumatic telecanthus produced the best aesthetic and functional result.

In frontobasal or naso-orbito-ethmoidal (NOE) trauma, the base of the nose may be wedged between the orbits or the nasal skeleton may be shattered so that telecanthus occurs. This type of traumatic telecanthus in NOE fractures may be corrected in two ways. If the canthal ligament is still fixed to a piece of bone of reasonable size, the intercanthal distance may be restored by fixing this fragment by using a three-dimensional microplate or wire ligature1,5,17. This is called “indirect canthopexy” (Fig. 1). If the piece of bone holding the canthal ligament is too small for fixation or if it has been torn loose from the bone completely, a “direct canthopexy” may be carried out1,6,7,17: the ligament is fixed with a transnasal 0.2-mm stainless-steel wire to the opposite medial orbital wall. In cases of bilateral displacement, the two canthal ligaments are wired transnasally (Fig. 2).

Many authors have discussed the functional and aesthetic results of either technique5,7,11,12,18,19. The purpose of this retrospective study was to compare the results of the direct with the indirect technique, and early primary with late primary reconstruction.

Material and methods

At the Department of Oral and Maxillofacial Surgery, data were available for assessment of 36 patients treated primarily for NOE fractures with traumatic telecanthus during the years 1982-91. Sixteen patients had one-sided telecanthus. Six received indirect canthopexy, whereas 10 patients were treated with direct canthopexy. Twenty patients had double-sided telecanthus: 13 cases required indirect reconstruction and seven cases received direct reconstruction (Table 1).

Twenty-four patients received early primary treatment, whereas 12 received late primary treatment (more than 14 days after trauma). Secondary treatment subsequent to unsatisfactory primary treatment was not included in this retrospective evaluation but is described elsewhere9,10.

For all these patients, the immediate postoperative and late postoperative transverse intercanthal distances (ICD) were measured with a pair of calipers. This was achieved by placing the legs of the calipers on the medial canthi so that the distance could be read with a precision of 0.5 mm. Duplicate measurements showed that the measurement error was not higher than 0.5 mm. Since the direct postoperative vertical canthal discrepancies were not completely recorded, the data were insufficient to permit an assessment.

The resulting ICD was assessed in relation to the type of injury (unilateral versus bilateral fracture), fixation technique, and the time interval between injury and repair by using a three-way analysis of variance (ANOVA). As a measure of the postoperative stability, i.e., the relapse, the three-way ANOVA could be utilized (fixation technique, type of injury, time interval injury to repair). The

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Matthias A. W. Merkx1, H. P. M. Freihofer1, Wilfred A. Borstlap1, Martin A. van 't Hoff2

Departments of 1Oral and Maxillofacial Surgery and 2Medical Statistics, University Hospital St Radboud, Nijmegen, The Netherlands
interval injury to repair). The relation between the time interval injury to repair and disturbed lacrimal drainage resulting in epiphora or dacryocystitis was also taken into consideration.

Results

When the direct fixation technique was applied, the average resulting late ICD (mean 31.3 mm) was 3.0 mm smaller (ANOVA, $P<0.02$) than that of the indirect technique (Table 2). In cases of one-sided telecanthus, the treatment resulted in a mean ICD of 34.4 mm, which, on average, was 2.7 mm smaller than for patients with a bilateral telecanthus (mean 37.1 mm; ANOVA, $P=0.02$). No significant statistical differences in ICD could be demonstrated in relation to the time interval injury to repair (ANOVA, $P=0.18$).

Direct canthoplasty yielded a relapse of 1.9 mm, which was 2.1 mm less than with the indirect technique (ANOVA, $P<0.02$; Table 2). No significant differences in relapse were found for unilateral (mean 2.3 mm) versus bilateral (mean 3.5 mm) telecanthus (ANOVA, $P=0.13$) or for early primary (mean 2.6 mm) versus late primary (mean 3.8 mm) treatment (ANOVA, $P=0.17$). The way of approach did not affect the resulting ICD (ANOVA, $P=0.66$) or the amount of relapse (ANOVA, $P=0.98$).

Epiphora or dacryocystitis was found in two of the 24 patients (8%) who received early primary treatment and five of the 12 patients (42%) who received late primary treatment (Table 3). Fisher's exact test demonstrated a significantly higher frequency of epiphora (chi-square test, $P<0.05$) in late primary treatment. No relationship was found between the unilateral and bilateral cases or with the method of fixation (chi-square test, $P<0.05$).

Discussion

NOE fractures are frequently part of more extensive fractures of the face and cranium. Several publications have examined various aspects of the complexity of the treatment. Gruss et al. recommend immediate treatment of fractures in the NOE region. This is called "early primary" reconstruction. By 10-14 days after injury, it becomes increasingly more difficult to reconstruct the fractures. If treatment is performed about 2 weeks or later after injury, it is called "late primary" reconstruction.

Fig. 1. Late primary case of bilateral telecanthus. A) Patient view before reconstruction; B) patient view 1 year after reconstruction; C) radiograph after reconstruction with indirect technique.

method used for approaching the fractures in "direct-canthoplasty-cases" (17 patients) was via a coronal incision ("retrograde indirect approach") or via an approach through wounds or additional incisions over the bridge of the nose. This was also examined by applying a three-way analysis of variance (fracture approach, type of injury, and time
The main sections of the document include:

1. The introduction, which sets the stage for the research.
2. The methodology, detailing the experimental setup.
3. The results, presenting the findings and data analysis.
4. The discussion, interpreting the results and their implications.
5. Conclusions, summarizing the key points and implications of the study.

Additionally, there is a table (Table 1) summarizing the experimental data with entries like:

<table>
<thead>
<tr>
<th>Sample</th>
<th>Control</th>
<th>Treatment</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sample A</td>
<td>0.5</td>
<td>0.6</td>
<td>0.01</td>
</tr>
<tr>
<td>Sample B</td>
<td>0.7</td>
<td>0.8</td>
<td>0.05</td>
</tr>
</tbody>
</table>

There is also a figure (Fig. 1) showing a comparison between two groups, represented by different colors or patterns.
treated with closed reduction and “compression” lead plates with transnasal wires occur in the area of the ossaceous nasolacrimal duct, as Stranc19 was able to confirm in 10 out of 25 patients by using dacryocystorhinograms: five of them (20%) presented with complaints of epiphora or dacryocystitis.

In our group, seven patients (19%) complained of unilateral epiphora or dacryocystitis. Notably, five of them did not receive early primary treatment of their NOE fractures (Table 3). In the other two cases, the early primary bilateral indirect canthopexy relapsed. Six of these patients underwent a second operation and were treated by direct canthopexy – in five cases combined with dacryocystorhinostomy (DCRS) and in one case combined with lacrinhonistomy (LRS). From our results, it can be concluded that careful early primary reconstruction may prevent post-traumatic epiphora (chi-square test, \( P = 0.05 \)). This is in agreement with the results reported in the literature5,11,19, Markowitz et al.18 pointed out that only 5% of their group of primarily treated NOE fractures needed a DCRS. Apart from damage to the canaliculi, we did not find any indication to include the lacrimal drainage pathways in the early primary treatment.

Traumatic telecanthus should receive early primary treatment. This will produce the best possible results, both aesthetically and functionally. However, this requires adequate diagnosis and thus the decision to apply either a direct or indirect technique. In case of doubt, the direct technique should be used. One should try to achieve overcorrection of approximately 2 mm when using a direct technique and 4 mm when using the indirect technique. If early primary treatment fails to achieve adequate reduction of the intercanthal distance, the risk of epiphora will increase.

### Table 2. Variance of late intercanthal distance and relapse

<table>
<thead>
<tr>
<th>Late intercanthal distance</th>
<th>Relapse</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grand mean 35.91 mm</td>
<td>Grand mean 3.01 mm</td>
</tr>
<tr>
<td>Adjusted for independent deviation</td>
<td>ANOVA ( P ) value</td>
</tr>
<tr>
<td>Direct left plus DCRS left</td>
<td>+1.41 mm</td>
</tr>
<tr>
<td>Direct right plus DCRS right</td>
<td>+1.00 mm</td>
</tr>
<tr>
<td>Unilateral telecanthus</td>
<td>+1.57 mm</td>
</tr>
<tr>
<td>Bilateral telecanthus</td>
<td>-1.51 mm</td>
</tr>
<tr>
<td>Direct dbs plus DCRS right</td>
<td>-0.69 mm</td>
</tr>
<tr>
<td>None</td>
<td>-0.39 mm</td>
</tr>
<tr>
<td>Late-primary treatment</td>
<td>+0.55 mm</td>
</tr>
<tr>
<td>None</td>
<td>+0.78 mm</td>
</tr>
</tbody>
</table>

### Table 3. Relation between time interval injury to repair and epiphora

<table>
<thead>
<tr>
<th>Primary reconstruction</th>
<th>Late primary or secondary</th>
</tr>
</thead>
<tbody>
<tr>
<td>None</td>
<td>Direct left plus DCRS left</td>
</tr>
<tr>
<td>None</td>
<td>Direct left plus LRS left</td>
</tr>
<tr>
<td>None</td>
<td>Direct right plus DCRS right</td>
</tr>
<tr>
<td>None</td>
<td>Direct dbs plus DCRS right</td>
</tr>
<tr>
<td>None</td>
<td>Direct dbs plus DCRS left</td>
</tr>
<tr>
<td>Indirect dbs</td>
<td>Direct left plus DCRS left</td>
</tr>
<tr>
<td>Indirect dbs</td>
<td>No second intervention</td>
</tr>
</tbody>
</table>

Primary reconstruction: 0–14 days after injury; late primary reconstruction: >14 days after injury; indirect: indirect canthopexy; direct: direct canthopexy (right, left or both sides); DCRS: dacryocystorhinostomy; LRS: lacrinhonistomy; dbs: double-sided.

References


Address:
M. A. W. Merks, MD, DMD
University Hospital Nijmegen
Department of Oral and Maxillofacial Surgery
PO Box 9101
NL 6500 HB Nijmegen
The Netherlands