Prospective Clinical Assessment of Morbidity After Chin Bone Harvest

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Abstract: The aim of this prospective research was to assess soft tissue morbidity in the symphyseal region after bone graft harvesting. Thirty patients, with average age 45 years, underwent symphyseal bone graft harvesting followed up for a period of 12 months. Follow-up involved neurosensory testing of 2-point discrimination, static light touch, brush directional stroke, pinprick, and thermal discrimination to cold and hot; the statistical analysis was performed using McNemar test and Friedman test with P < 0.05. The results showed that 50% of patients had postoperative morbidity in the first month after surgery showing statistical positive relation with surgery (P < 0.05); at 6 months, this situation diminished to 23%, and at the end of the monitoring period (1 year); the neurosensory tests revealed no persistent morbidity. In conclusion, all neurosensory tests revealed high morbidity in the first month with total resolutions at 1-year follow-up; however, this complication associated to surgery is indispensable to discharge the patient properly.

Key Words: Surgical complications, neurosensory alteration, osseous graft


The use of symphyseal donor site for osseous graft reconstruction is a predictable technique with convenient surgical access and sufficient bone (quantity and quality).1–3 The embryologic origin of this donor site has been associated to rapid angiogenesis with maintained volume and viability of application.4,5

The application of chin bone has been varied in the surgical literature and has been applied to orbital floor reconstruction,6 reconstruction of alveolar cleft,7,8 and inlay/onlay reconstruction of maxilla or mandible for implant insertion.9 Most research related to symphyseal donor site and addressed surgical technique and applications with minor considerations in soft tissue management, suture technique, and sensations in alteration of the chin.3,10

MATERIALS AND METHODS

A sample of 30 patients was included (22 female and 8 male patients) with mean age of 45 years (range, 21–65 years); the patients presented indication of alveolar reconstruction for installation of dental implant; patients were excluded if they had trauma history, presence of surgery in the craniofacial skeleton, and presence of bone metabolism disorder.

Surgical Procedure

Two surgeons performed all the procedures. The surgical approach was realized with an incision 5 mm inferior to the muco-gingival line between the canines; a full-thickness mucosal flap was raised, and the location of mental foramina was observed. For all of the cases, a 5-mm safety margin was allowed inferior to the apices, lower border of the mandible, and from the mental foramina. A corticocancellous bone was removed with chisel and curettes, and the harvest bone was preserved in a cold saline solution. The flap was repositioned, and the wound was closed in 2 planes; the first plane of periosteum and mental muscle received 3 points of suture (catgut 3-0 Catcromo, Pointsuture, Fortaleza, Brazil) being 1 central and 2 lateral, looking for a proper repositioning of mental muscle; the mucosal plane was realized with continuous suture (catgut 3-0 Catcromo, Pointsuture, Fortaleza, Brazil). Finally, an extraoral pressure was maintained with an adhesive tape on the chin for reduction of edema and hematoma, which was removed after 72 hours.

Evaluation of Chin Sensation

One observer realized sensorial test in the preoperative and postoperative period, including the first month after surgery and at 6 and 12 months. The chin area was divided in 6 zones (Fig. 1), being each test performed 3 times for each zone in each period of evaluation; absence of alteration was indicated when the patient related...
negative responses in 2 evaluations on the zone. The sensorial tests were as follows:

1. Two-point discrimination (TPD) was executed with a compass of 2 filaments with 10-mm distance between them; the patient recognized the presence of 0, 2, or 2 points (Fig. 2).

2. In static light touch (SLT), 6 monofilaments of nylon were used (Semmes-Weinstein) with same length but with differences in diameter and colors presented in the following sequence: green (0.05 g), blue (0.2 g), purple (2.0 g), dark red (4.0 g), orange (10.0 g), and silver red (300.0 g). The monofilament started with the smaller caliber to major caliber, and the force of application reached to cure the monofilament, then was gently removed (Fig. 3). The values of interpretation were 1 to 6, with 1 (green) being total sensation and 6 (silver red) absent of sensation (green [1], blue [2], purple [3], dark red [4], orange [5], and silver red [6]).

3. Brush directional stroke (BDS) with a fine brush was realized movement from left to right and from right to left on soft tissue of chin, a positive response was considered when the patient identified the direction of movement (Fig. 4).

4. In pinprick (PP), a needle of 25 × 7 mm was applied on the cutaneous tissue of chin, and a positive response was accepted when the patient recognized a light pain sensation (Fig. 5).

5. In thermal cold discrimination, in a portion of flexible cotton a solution of a cooling spray (Endo Ice, Coltene/Whaledent, Curitiba, Brazil) was installed with −50°C and was applied on the soft tissue of the chin, with a positive response when the patient recognized a sensation of cold (Fig. 6).

6. In thermal hot discrimination, a portion of Godiva (Dfl; Rio de Janeiro, Brazil) was heated in hot water with a minimum of 50°C and was applied on the soft tissue of the chin, with a positive response when the patient recognized a sensation of hot (Fig. 7).
with the altered sensation reported by Clavero and Lundgren, of morbidity; this situation represents minor values when compared to 80% of sample in the same period.

The tests used in this research are appropriate for analysis of surgical morbidity was not observed in a 12-month period. Joshi observed 33% of sensorial alteration; in our research, morbidity was not observed in a 12-month period.

Some works confirm the results of this research but most of them showed that the sensorial alteration is maintained for periods longer than 12 months. We believe that these differences can be associated to surgical technique, amount of bone removed, instruments used in the osteotomy (eg, quality of the drills and refrigeration), and depth of osteotomy.

On the other hand, in the sixth month, 23% of the patients presented sensorial alteration with possible complications related to daily life. Although the removal of bone from the chin region is predictable in terms of reconstruction results, the clinician should point to the patient the risk of sensorial alteration.

TABLE 1. Distribution of Patient With Negative Response to Neurosensory Test (Not Affected)

<table>
<thead>
<tr>
<th>Month</th>
<th>TPD</th>
<th>BDS</th>
<th>PP</th>
<th>TCD</th>
<th>THD</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>0 (0%)</td>
<td>0 (0%)</td>
<td>0 (0%)</td>
<td>0 (0%)</td>
<td>0 (0%)</td>
</tr>
<tr>
<td>1</td>
<td>14 (47.6%)*</td>
<td>12 (40%)*</td>
<td>15 (50%)*</td>
<td>10 (33.3)*</td>
<td>11 (36.6)*</td>
</tr>
<tr>
<td>6</td>
<td>4 (13.3%)</td>
<td>4 (13.3%)</td>
<td>7 (23.3%)*</td>
<td>2 (6.6%)</td>
<td>1 (3.3%)</td>
</tr>
<tr>
<td>12</td>
<td>0 (0%)</td>
<td>0 (0%)</td>
<td>0 (0%)</td>
<td>0 (0%)</td>
<td>0 (0%)</td>
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</tbody>
</table>

*Positive statistical relation with a McNemar test ($P < 0.05$). TCD indicates thermal cold discrimination; THD, thermal hot discrimination.

**RESULTS**

Table 1 presents the morbidity related to surgery, and it can be observed that all tests presented sensorial morbidity with statistical significance ($P < 0.05$) for the first evaluation on day 30 after surgery. In fact, more patients were affected by PP (50%, n = 15) followed by TPD (47.6%, n = 14); on the other hand, some sensation was observed (in the same period) in the SLT when the tests were applied.

In the 6-month evaluation, the PP test presented 7 patients (23.3%) affected by surgical morbidity, being statistically significant ($P < 0.05$); morbidity associated to surgical procedure was observed in 4 patients (13.3%) in TPD and SLT.

Morbidity related to altered sensation was not observed in the 1-year follow-up; all sensory complications being absent; all affected patients returned to preoperative status.

**DISCUSSION**

The paresthesia related to bone harvest of chin probably resulted from neuropraxia of the incisive nerve or the end branches of the mental nerve and is one of the major problems for patients after surgery; some research related that this complications can persist in up to a third of patients.

The use of different neurosensory tests is applied in clinical practice to objectify the subjective conditions of the patient; these tests can be divided into mechanoreceptive (TPD, SLT, and BDS) and nociceptive (thermal discrimination and PP test). The TPD can be used for analyses of fiber with slow conduction; SLT can be used for rapid-conduction fiber, and the PP can be used for minor fiber.

The result of this research related high sensorial alteration in the first month after surgery with 50% of the sample with some grade of morbidity; this situation represents minor values when compared with the altered sensation reported by Clavero and Lundgren. Close to 80% of sample in the same period.

When analyzed at the sixth month after surgery, our own results presented 23.3%; Clavero and Lundgren reported close to 50% of morbidity in the first year after surgery, showing a reduction of 30% from the initial evaluation; in this direction, in a 12-month period, Joshi observed 33% of sensorial alteration; in our research, morbidity was not observed in a 12-month period.

Some works confirm the results of this research but most of them showed that the sensorial alteration is maintained for periods longer than 12 months. We believe that these differences can be associated to surgical technique, amount of bone removed, instruments used in the osteotomy (eg, quality of the drills and refrigeration), and depth of osteotomy.

On the other hand, in the sixth month, 23% of the patients presented sensorial alteration with possible complications related to daily life. Although the removal of bone from the chin region is predictable in terms of reconstruction results, the clinician should point to the patient the risk of sensorial alteration.

**REFERENCES**