OSTEOCHONDRAL CORONOID GRAFT AND LIGAMENT RECONSTRUCTION IN RECURRENT COMPLEX ELBOW INSTABILITY

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<thead>
<tr>
<th>Name</th>
<th>Financial Conflict</th>
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<tbody>
<tr>
<td>Alessandro Marinelli, MD</td>
<td>I have no financial conflict to disclose</td>
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<td>Matteo Bartoli, MD</td>
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RECURRENT INSTABILITY and CHRONIC CORONOID DEFICIT

BACKGROUND:

CHRONIC CORONOID DEFICIENCY IS A CHALLENGING CONDITION THAT CAN OCCUR SUBSEQUENT TO CORONOID FRACTURE MALUNION - NONUNION OR POST-TRAUMATIC HYPOPLASIA

SEVERAL SURGICAL OPTIONS HAVE BEEN DESCRIBED TO RECONSTRUCT THE CORONOID USING: BONE (ILIAC CREST) OR OSTEOCHONDRAL GRAFTS (OLECRANON TIP, RADIAL HEAD, CORONOID)

WE HYPOTHESIZED THAT BOTH CORONOID AND RADIAL HEAD ALLOGRAFT COULD RESTORE ELBOW STABILITY AND CONGRUITY
METHODS:

IN 8 CONSECUTIVE CASES AFFECTED BY RECURRENT COMPLEX INSTABILITY FOR A CORONOID DEFICIENCY, THE CORONOID WAS RECONSTRUCTED USING AN OSTEOCHONDRAL FRAGMENT FROM A FROZEN ALLOGRAFT CORONOID (4 CASES) OR RADIAL HEAD (4 CASES).

THE LCL WAS RECONSTRUCTED IN 6 PATIENTS, THE MCL IN 2 CASES.

THE PATIENTS WERE FOLLOWED-UP FOR A MEAN OF 48 MONTHS, A CT SCAN WAS PERFORMED IN ALL THE PATIENTS TO EVALUATE THE HEALING OF THE GRAFT.
CORONOID ALLOGRAFT RECONSTRUCTION

SURGICAL TECHNIQUE: Hotchkiss Approach

• Correct assessment of the implant base: *cancellous bone has to be well exposed*

• Setting and sizing of the transplant: *it has to exceed of 2 or 3 mm in length the implant base*

• Temporarily fixation: *K wire and dynamic intra-operative x-ray check*

• Definitive fixation: perfect onsite shaping of the graft and *obtain the maximum compression!*

  External fixation is not necessary
THE ANNULAR CONVEX SURFACE OF THE RADIAL HEAD IS PLACED AGAINST THE TROCHLEA AND FIXED WITH 2 RETROGRADE AND 1 ANTEGRADE SCREWS. THE PATIENTS WERE IMMOBILIZED POSTOPERATIVELY FOR 3 WEEKS IN A CAST. A REMOVABLE SPLINT, TAKEN OFF TO DO GENTLE RANGE OF MOTION EXERCISES IN THE OVERHEAD POSITION, IS USED FOR 3 WEEKS FURTHER.
RESULTS:

MEAN FOLLOW UP: 48 MONTHS (18-122)

ALL THE PATIENTS ACHIEVED A SIGNIFICANTLY IMPROVED ELBOW, WITH A FUNCTIONAL RANGE OF MOTION (COMPLETE IN 4 CASES)

CT SCAN SHOWED UNION OF THE GRAFT, WITHOUT EVIDENCE OF GRAFT RESORPTION OR DEGENERATIVE CHANGES.

ONE OF THE PATIENTS TREATED WITH A RADIAL HEAD GRAFT PRESENTED PERSISTENT (AND PRE-EXISTING) ULNAR NERVE SYMPTOMS WITH A MILD ELBOW INSTABILITY.

7 PATIENTS ACHIEVED A CONGRUENT AND STABLE JOINT.

6 CASES WERE PAIN-FREE.
<table>
<thead>
<tr>
<th>Ys</th>
<th>SEX</th>
<th>CORONOID and LIGAM. RECONSTRUCTION</th>
<th>FIXATION</th>
<th>F.U. (months)</th>
<th>VAS Pre - Post</th>
<th>MEPS Pre - Post</th>
<th>Quick-DASH</th>
<th>ROM</th>
<th>CT-scan: Graft resorption</th>
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<tr>
<td>1</td>
<td>22</td>
<td>M Coronoid graft + LCL</td>
<td>1 screw</td>
<td>36</td>
<td>7 - 1</td>
<td>75-100</td>
<td>65.9 - 4.5</td>
<td>Complete pre and post</td>
<td>NO</td>
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<td>2</td>
<td>32</td>
<td>M Coronoid graft + LCL</td>
<td>1 screw, 1 K wire</td>
<td>122</td>
<td>5 - 0</td>
<td>75-100</td>
<td>65.9 - 0.0</td>
<td>Complete pre and post</td>
<td>NO</td>
</tr>
<tr>
<td>3</td>
<td>33</td>
<td>M Coronoid graft + LCL</td>
<td>1 plate</td>
<td>26</td>
<td>7 - 3</td>
<td>60-70</td>
<td>70.5 - 20.5</td>
<td>Improved</td>
<td>NO</td>
</tr>
<tr>
<td>4</td>
<td>18</td>
<td>M Coronoid graft + MCL</td>
<td>1 screw, 1 K wire</td>
<td>38</td>
<td>5 - 0</td>
<td>65-100</td>
<td>52.3 - 2.3</td>
<td>Complete pre and post</td>
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<tr>
<td>5</td>
<td>24</td>
<td>F Radial Head graft + LCL</td>
<td>3 screws</td>
<td>60</td>
<td>4.5 - 1.5</td>
<td>50-90</td>
<td>68.2 - 6.2</td>
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<tr>
<td>6</td>
<td>24</td>
<td>F Radial Head graft + LCL</td>
<td>3 screws</td>
<td>18</td>
<td>3 - 1</td>
<td>70-95</td>
<td>40.9 - 9.1</td>
<td>Complete pre and post</td>
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<tr>
<td>7</td>
<td>16</td>
<td>F Radial Head graft + LCL</td>
<td>3 screws</td>
<td>30</td>
<td>5 - 2</td>
<td>45-80</td>
<td>63,6 - 9,1</td>
<td>Improved</td>
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<tr>
<td>8</td>
<td>44</td>
<td>F Radial Head graft + MCL</td>
<td>3 screws</td>
<td>54</td>
<td>7.8 - 7</td>
<td>30-45</td>
<td>70,5 - 61,4</td>
<td>Improved</td>
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Case 2: carpenter

CORONOID ALLOGRAFT

PRE-OP

32 yrs
Recurrent Instability

POST-OPERATIVE

f.u. 10 yrs
Case 4: cyclist
CORONOID ALLOGRAFT

18 ys
Recurrent Instability

PRE-OP

POST-OPERATIVE

f.u. > 3 ys
Case 6: RADIAL HEAD ALLOGRAFT

PRE-OP

24 ys
Recurrent Instability

POST-OPERATIVE

f.u. 1.5 ys
Case 5: RADIAL HEAD ALLOGRAFT

PRE-OP

24 ys
Recurrent Instability

POST-OPERATIVE

f.u. 1 y
f.u. 2 ys
f.u. 3 ys
CORONOID DEFICIT:
ALLOGRAFT RECONSTRUCTION

CONCLUSIONS:

THE RESULTS OF OUR CASE SERIES SHOW THAT BOTH FROZEN ALLOGRAFTS HARVESTED FROM CORONOID OR RADIAL HEAD CAN BE USED TO RECONSTRUCT A CHRONIC CORONOID DEFICIENCY. THE CHOICE BETWEEN CORONOID OR RADIAL HEAD ALLOGRAFT CAN BE BASED ON THE SURGEON’S PREFERENCE.

THE HEALING WITHOUT SIGNIFICANT RESORPTION OF THE GRAFT IN ALL CASES ENCOURAGES THE USE OF AN OSTEOCHONDRAL ALLOGRAFT, THAT, IF APPROPRIATELY SHAPED, ANATOMICALLY POSITIONED AND STRONGLY FIXED, HAS SHOWN A HIGH RATE OF HEALING WITH RESULTS MAINTAINED OVER TIME.


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