A COMPARISON BETWEEN DART-THROWING MOTION PLANE ROM AND THE DASH SCORE AFTER DISTAL RADIUS FRACTURE

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INTRODUCTION

Motion of the midcarpal joint of the wrist extends from radiodorsal to ulnopalmar in radioulnar deviation, in dart-throwing motion (DTM), and in flexion-extension motion. The movement from radiodorsal to ulnopalmar is called DTM. Radioulnar deviation and flexion-extension motion are combined the DTM of the midcarpal joint and motion of the radiocarpal joint. Motion of the radiocarpal joint approaches zero at wrist positions along DTM. Many ADL require a wrist motion. The movement often used is DTM.

Distal radius fractures are common injuries. There is no relation in the ADL and ROM after a fracture of the distal radius. Only grip strength has relation. However, there is no report about DTM plane ROM after a fracture of the distal radius. The aim of this study was to examine the relationship between dart-throwing motion plane ROM and patient-perceived outcome, measured by the Disabilities of the Arm, Shoulder, and Hand outcome (DASH) score in patients with healed distal radius fractures.

METHODS

The subject was 18 patients with healed distal radius fractures (AO classification types A(1), B(2), C(15)). Their mean age was 63.5 ± 16.4 years. Twelve patients were treated with volar plate. Six patients were treated with plaster splint. Evaluation criteria were taken as the DASH score, ROM (flexion-extension, radioulnar deviation, pronation-supination, DTM plane), and the grip strength. DTM plane ROM was measured with the developed goniometer (Fig.1). We defined the DTM plane as the movement to the upper and lower sides by the posturing of 45° of pronation (Fig.2). Intra-rater and inter-rater reliability of the developed goniometer exceeded 0.83. Grip strength is expressed as a percentage of the uninjured wrist’s value. Statistical analysis searched for description of linear correlations between DASH score and ROM, grip strength with Pearson’s product moment test. Differences were considered significant at p-values < 0.05.

RESULTS AND DISCUSSION

Table 1 gives the result of the DASH score, ROM, and grip strength.

There were the correlations between DASH score and DTM plane ROM (r = -0.65, p = 0.004) (Fig.3), grip strength (r = -0.49, p = 0.040) (Fig.4). We found no statistical relationship between the DASH score and other ROM.
Table 1: The result of the DASH score, ROM, and grip strength.

<table>
<thead>
<tr>
<th>Metric</th>
<th>n=18</th>
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<tbody>
<tr>
<td>DASHscore</td>
<td></td>
<td>27.5±21.7</td>
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<tr>
<td>flexion-extension</td>
<td></td>
<td>131.1±19.8</td>
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<tr>
<td>radioulnar deviation</td>
<td></td>
<td>56.9±8.5</td>
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<tr>
<td>pronation-supination</td>
<td></td>
<td>162.2±17.1</td>
</tr>
<tr>
<td>DTM plane ROM</td>
<td></td>
<td>62.5±16.2</td>
</tr>
<tr>
<td>grip strength</td>
<td></td>
<td>0.69±0.2</td>
</tr>
</tbody>
</table>

Grip strength: percentage, ROM: degree

There were the correlations between DASH score and DTM plane ROM ($r = -0.65$, $p = 0.004$) (Fig.3), grip strength ($r = -0.49$, $p = 0.040$) (Fig.4). We found no statistical relationship between the DASH score and other ROM.

The movement on a DTM plane most often uses after a fracture of the distal radius, and it is an important movement direction.

![Figure 3: The correlations between DASH score and DTM plane ROM ($r = -0.65$, $p = 0.004$).](image)

Furthermore, although the past study has reported that grip strength serves as a parameter of a functional revivification of a wrist, this result is suggested we can grasp a recovery process also by measuring DTM plane ROM.

Figure 4: The correlations between DASH score and grip strength ($r = -0.49$, $p = 0.040$).

![Figure 4: The correlations between DASH score and grip strength.](image)

CONCLUSIONS

We investigated the relation between the DASH score and DTM plane ROM. There were the correlations between DASH score and DTM plane ROM ($r = -0.65$, $p = 0.004$). The movement direction which a movement on DTM plane most often uses after a fracture of the distal radius, and it is an important movement direction.

REFERENCES