Press Ups

Introduction

The push-up exercise is a convenient and effective way to work the muscles of the upper body. Several major muscle groups are exercised with a simple motion. Push-ups can be done anywhere at anytime, using your own body weight as resistance. They can also be made more difficult by changing your leg position to work the upper body from a different angle. For the beginner; incline press ups are ideal before moving onto traditional press ups due to the decreased amount of resistance on the muscles, the decline press ups provide an increased level of resistance from the traditional press ups and provide an alternative. Decline pushups are significantly more challenging than regular pushups, so they should be executed by advanced exercisers who have already mastered a regular pushup. The Press Up recruits multiple muscles from the upper body. Muscles such as Tricep brachii are the group of muscles on the back of the upper arm. The Triceps are essential to the pushing motion of the arms. Triceps make up about two-thirds of the muscle mass of the upper arms. Pectoralis major is the two large muscles of the chest. Posterior deltoid is located on the back of the shoulder and plays a major role in maximizing the size and shape of your shoulders. The purpose of the muscle is primarily transverse extensions, meaning movement of the arm horizontally away from the chest. Serratus anterior is a ridge-shaped muscle that originates on the upper eight or nine ribs and is inserted on the medial and anterior border of the scapula. The primary action of the Serratus anterior is protraction and upward rotation of the scapula. Highlighted below are the muscles used during the Press Up (see Figure 1).

Figure 1: Muscles involved in the Press Up. A: Triceps Brachii, B: Pectoralis Major, C: Posterior deltoid, D: Serratus anterior (retrieved Wikipedia).
The different Press Up variations can be observed in Figure 2 and Figure 3. As illustrated the variations can include different shoulder widths and also can be completed in either a decline or incline position.

**Hand Position**

Youdas et al. (2010) and Cogley et al. (2005) reported the electromyographic (EMG) activation of different muscles during the Press Up when different hand positions were used (See Table 1). As can be observed from Table 1 certain hand positions resulted in greater activation of certain muscle groups. The main findings of these studies were that the narrow base (NB) position resulted in greater muscle activation in the Posterior deltoid (18% MVIC), Tricep Brachii (83% MVIC), and the Pectoralis Major (86% MVIC). Greater EMG activation in the Serratus Anterior was found in the shoulder width position during the Press Up e.g. 86% MVIC (SW) vs. 70% MVIC in NB position.
Table 1. Greatest muscle activation (EMG) during variations of Press-Ups with different hand variations.

<table>
<thead>
<tr>
<th>Hand position</th>
<th>Pectoralis Major (% MVIC)</th>
<th>Triceps Brachii (%MVIC)</th>
<th>Posterior Deltoid (%MVIC)</th>
<th>Serratus Anterior (%MVIC)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shoulder width base</td>
<td>64</td>
<td>69</td>
<td>13</td>
<td>86</td>
</tr>
<tr>
<td>Wide base</td>
<td>66</td>
<td>62</td>
<td>13</td>
<td>84</td>
</tr>
<tr>
<td>Narrow base</td>
<td>86</td>
<td>83</td>
<td>18</td>
<td>70</td>
</tr>
</tbody>
</table>

*MVIC = Maximal voluntary contractions

References


