Ground Time and Air Time

Of all of the general performance descriptors, ground time and air time provide the greatest insights into how the elite Sprint performance is accomplished. Since air time primarily dictates stride length, and the combination of ground and air time dictate stride rate, these time results provide further information regarding how the sprinter is allocating resources to achieve and maintain horizontal velocity.

The following Figures show the ground times (8-4) and air times (8-5) for all elite athletes investigated to date. Ground time is dependent upon how quickly the sprinter can produce the ground forces required to successfully project the body into the next airphase. As Figure 8-4 indicates, the better 100/200 sprinters minimize this variable, resulting in an increase in stride rate and, therefore, an increase in horizontal velocity (assuming no other results are affected by this change).

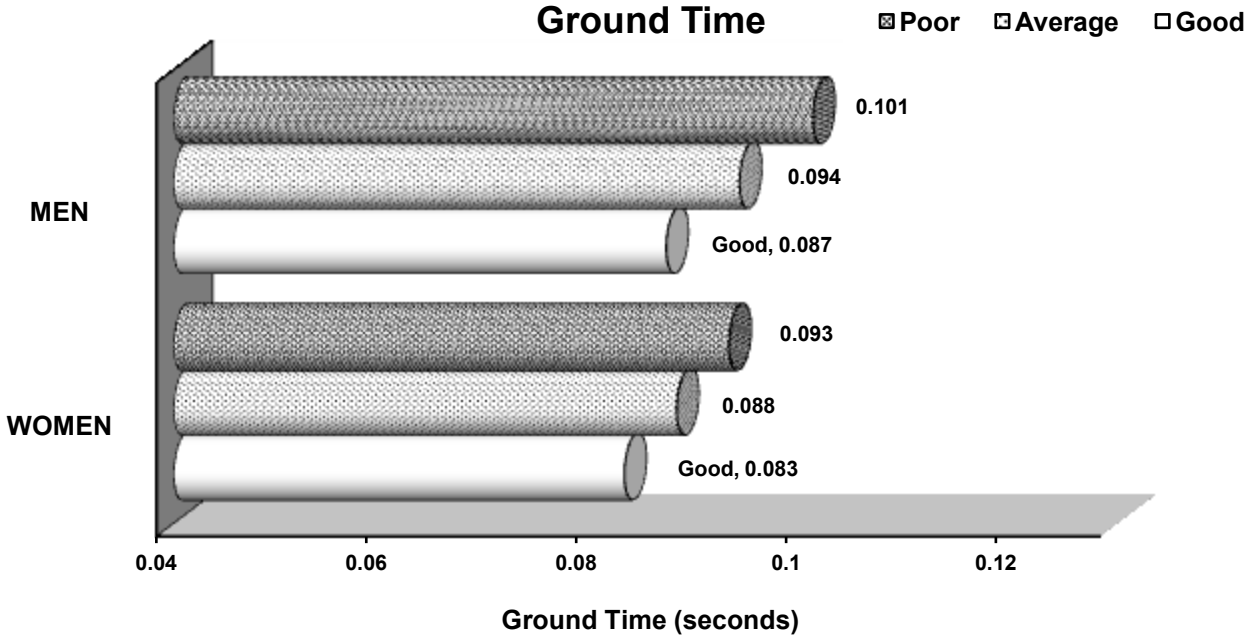

Figure 8-4: Ground Time Results

The air time results (Figure 8-5) are unique in that, regardless of the quality of the sprinter, there is **no difference in the air time results**. Thus, the only acceptable air time result is the average result. Note that the Poor result indicates that an air time that is either too short or too long is unwanted.

The time the sprinter spends in the air is one of three variables that dictate how far the body will travel during the stride. The other two are leg length and horizontal velocity. Since the sprinter has no control over leg length, and horizontal velocity is only the result of properly (or improperly) performing the activity, air time is the only major contributor to alteration in stride length over which the athlete has direct control. Thus, if stride length is to be increased, it can be accomplished by simply increasing air time. Unfortunately, an increase in air time also results in a

decrease in stride rate. Since, as previously indicated, elite sprinters place an emphasis on increasing stride rate, it is not surprising that there is no difference in the air time results of non-elite and elite sprinters.

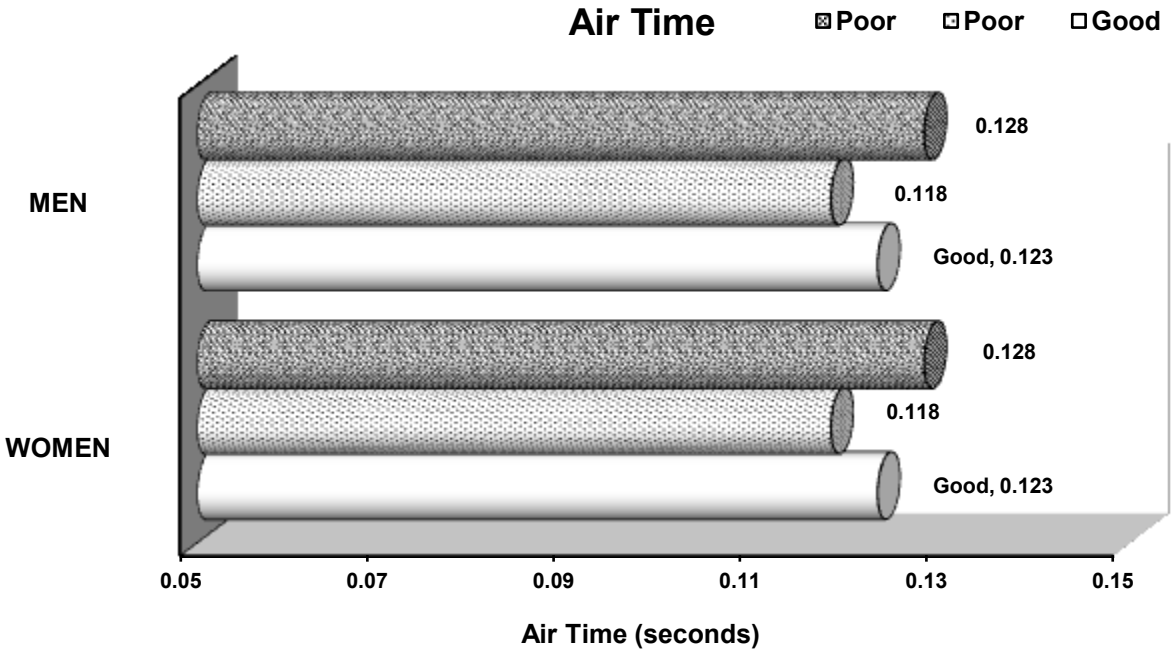

Figure 8-5: Air Time Results

Using the conclusion that increasing stride rate is beneficial, an argument could be made toward decreasing air time. Although this would decrease stride length, the resulting gain in stride rate should make the sacrifice justifiable. In fact, performance trends found in elite athletes actually support this conclusion. Unfortunately, it appears that the human body requires a minimum amount of air time to sufficiently recover the body segments in preparation for the next ground contact. It appears that, regardless of the size, gender, or quality of the sprinter, this time is virtually the same. Although, within this time the better sprinters produce a more proficient landing position, as well as superior limb velocities and accelerations, the time remains the same.

With the elimination of air time as a major contributor toward increasing sprint performance, **ground contact and the time that this phase requires becomes the area that must be exploited to produce maximum performance**. Since the ground phase of the sprint is the only time when the athlete can apply force to alter the body's velocity, it is not surprising that this is where great sprint results are produced.