Appendix A - Theoretical knowledge of golf

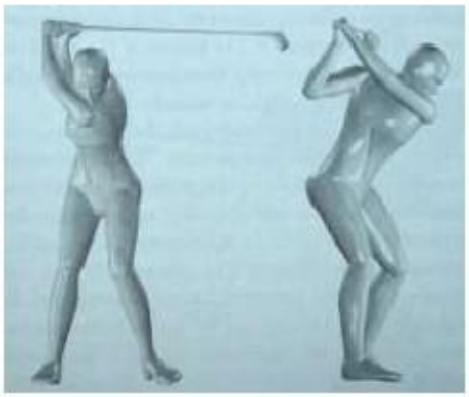
Theoretical knowledge of the golf swing plays an important role in the development of SwingImprover. As reflected in the scope of the product, it seeks not only be a drawing tool on the video, but it also assist the amateur golfer during the study process in successive stages of the swing.

But while our client is a professional golf instructor, the team had become so familiar with the vocabulary used in the sport, as in the theory behind a swing. To do this, and recommended by our customer, we studied the book "Swing Like a Pro" by Dr. Ralph Mann (Ph.D. in biomechanics) and Fred Griffin (renowned golf instructor).

This book is based on results of scientific research on the mechanisms of the golf swing. It methodically determines what and how an instructor must teach a golf swing. To do this, based on hundreds of hours of study on systematization of golfers made a swing to achieve a final model. Model in which was based SwingImprover building assistant for study of the measures.

The swing is divided into stages, which are threaded, meaning that in a bad posture affects directly to the rest, damaging then the end result of the coup. Below is presented a series of measures of the various stages of the swing, which were implemented in the application.

Such measures are separated by the steps of swing, and the plane in which it must be studied. These plans are called "face on", which is the front view of the player and "down the line", as seen in profile exemplified in Fig.



Face on **Down the line**

The result of this task is reflected in our application wizard which is available on the manual Annex F. The following information is provided to transmit theoretical knowledge of the swing. Translate these measures to the software also involves a study of the accuracy to be achieved with the application.

Setup

Initial position of the ball

The positioning of the ball has a huge influence on how the body reacts by attempting to "find" ball with the club head. If the ball is positioned correctly, it can swing freely without need to make compensations with the body. These distances can be studied from two prospects.

Controlling vertical movement due to bending of the knee

During the course of the swing legs stabilize the body height by bending the knees. This places the body in a position where the muscles stronger in the legs can be used to help generate a correct speed during the downswing.

Tilt column (K inverted position)

The inclination of the column to the right, combined with the position of the right knee and inside at an angle straightness of the body on the left side achieves a perfect position for the setup. This position is known as the K inverted position as shown in the figure below.

Position of the arms

It is necessary to form a perfect triangle with arms, rotated briefly due to the slope of the shoulders, as shown in Fig.

The position of the left arm is achieved by maintaining a straight line between the left shoulder and the grip. While the right arm is a bit more complex since it must be bent so as to allow the hand to achieve reach their location in the grip.

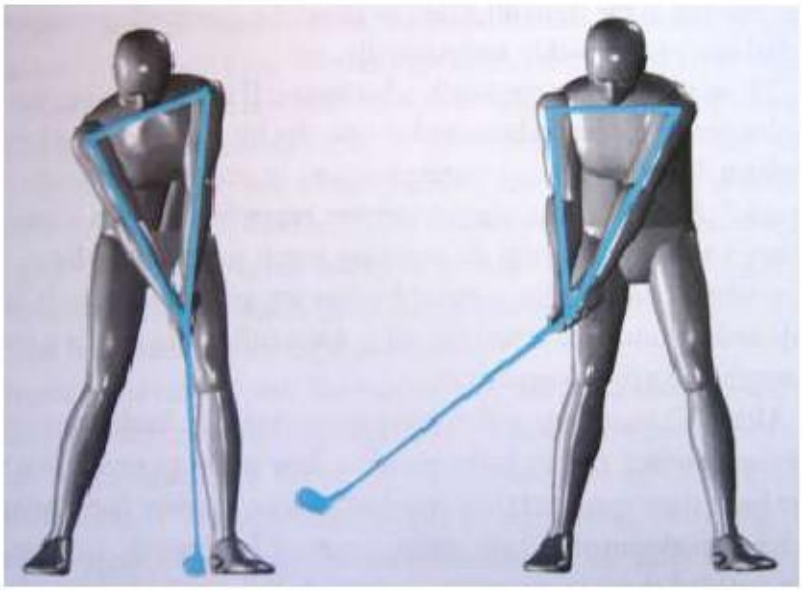
Distance from shoulder to club

The horizontal distance of the hands must be moderately distant from the shoulders so that the back of the club is more than 5 cm in front of the center of the shoulders.

Backswing

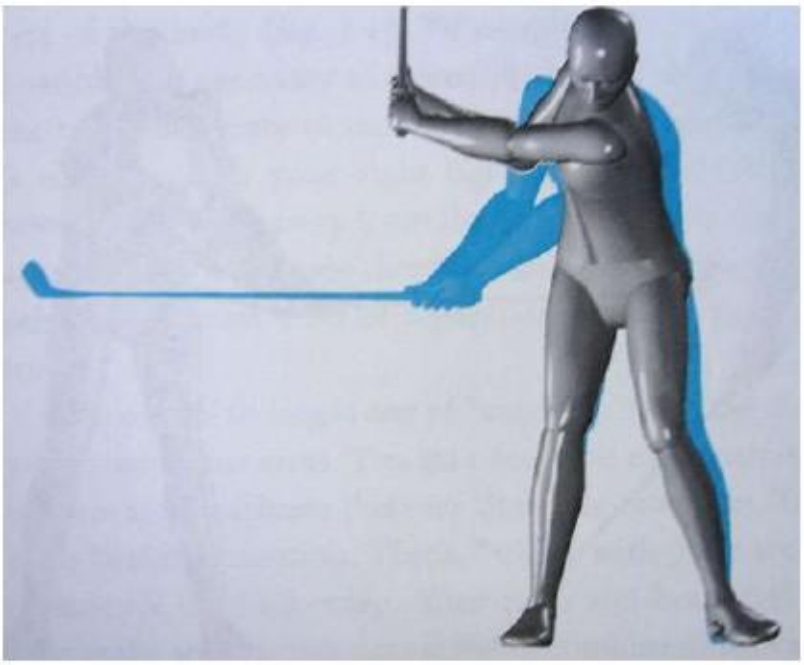
Behavior of the arms and shoulders as a unit

The triangle formed in the previous step must be kept virtually intact through the first third part of backswing. The important thing is not the quality of the triangle but it must remain intact until the hands reach the height of the left pocket.



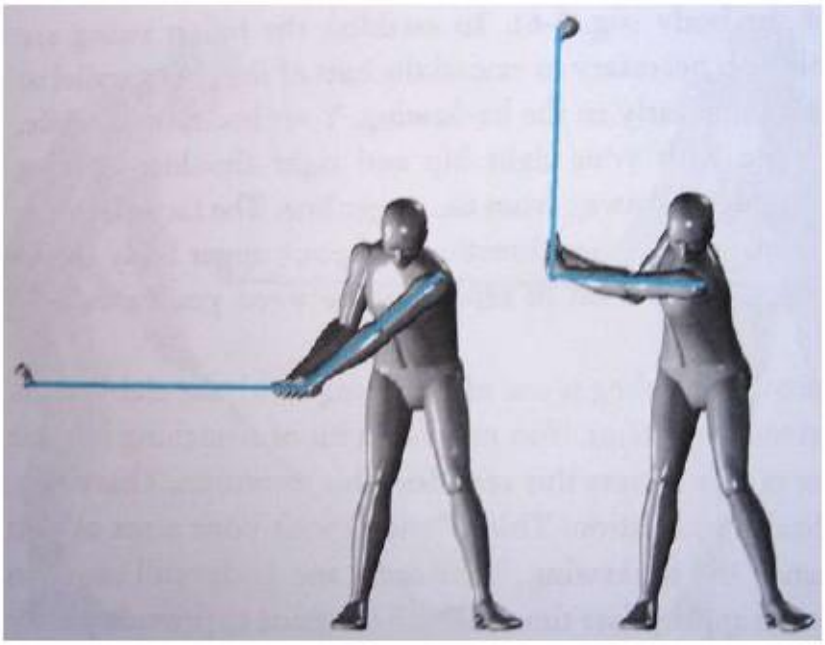
Rotation on the right side

Using the right leg as a center of rotation, you should rotate the hips, torso and shoulders away from the ball. The rotation continues until the backswing is completed.



Angle between the left and the club

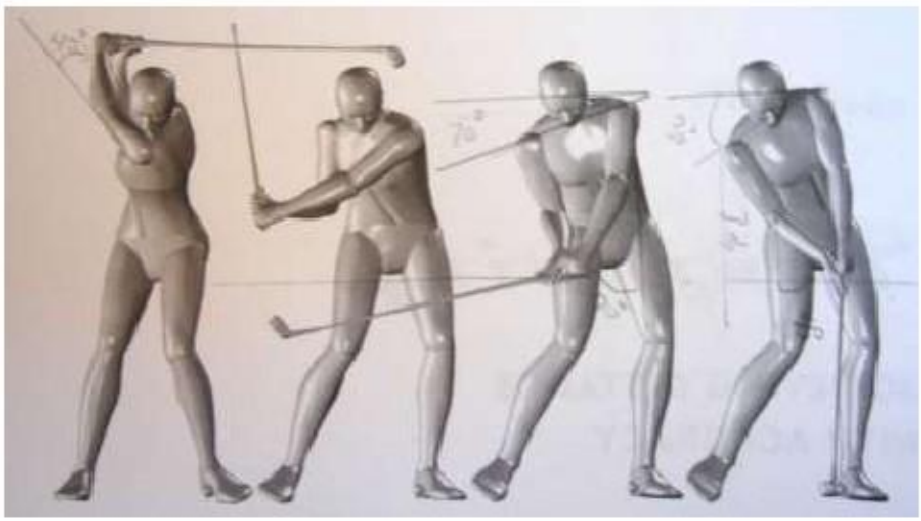
Once the takeaway is completed, wrists naturally begin to bend in response to the weight of club which increases as it moves away from vertical. With a well managed club grip can bend wrists easily without having to twist your hands to do.



Downswing

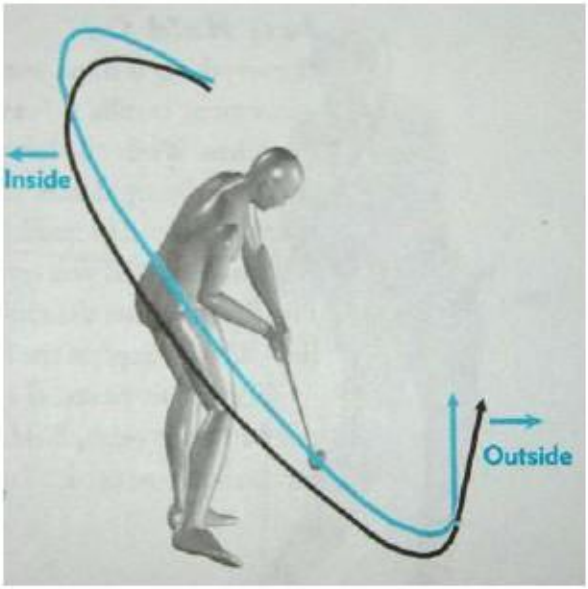
Number of angles at different stages of the backswing

The stage of the downswing is the one with the most explosive movements in sport. This step is essentially the which determines the distance and accuracy of the coup. There are a number of angles it important to study, as shown in the figure below.



Looking for the "impact path"

After the transition, keep the club in the correct plane is the most difficult in golf. Follow the map interior is easy during the backswing as the hips and shoulders are away from the target. The difficulty is internally to maintain during the transition and the downswing, when the hips and shoulders begin to rotate towards the target. The way to get a correct plane is to achieve maximum height in a good position, then continue right moves on the downswing.


Inside
Outside

References

MANN, Ralph, Griffin, Fred. 1998. *Swing Like a Pro* Broadway, 1st Edition