

1. Learning Motor Skills

Introduction

This section is the module is connected with the process involved when humans beings learn to perform a particular movement. Learning a motor skill is quite different from learning a cognitive skill. The control of motion is a complex process with many variables. Indeed, different control mechanisms are available and there is still considerable debate regarding their exact nature. This is due both to the complexity of the process and the relative youth of human movement sciences. The full golf swing is a complex motion which on the scale of difficulty is well towards the upper end of human capability. Particular characteristics of the swing which make it difficult are –

- Its whole body motion, where every major muscle group must contribute
- The timing of the motion is critical in that quite small deviations in muscle firing profiles produce large variations in shot outcome.
- The power levels required are very high and often are at the limit of what the golfer is capable.
- The precision required in positioning the clubface at impact exceeds that which most human activities require.
- When first attempted, the body usually under-estimates the effort required. This causes a totally inappropriate motion to be generated. Some golfers play their entire golfing lives without correcting this.

A couple of misconceptions regarding the golf swing need to be addressed at this stage.

1. It is often stated that the golf swing is a motor skill similar to riding a bicycle, in that once acquired, the skill will remain with the golfer forever. It is true that the motor program that generates the golf swing will be retained, but, without regular practice, the precision required for an effective swing soon disappears. Once a reliable swing is developed, it requires a substantial effort to maintain.
2. Golfers are often advised to swing slowly and smoothly. Indeed, the swing of good players often look slow and smooth. However, this is an illusion caused by the inability of the human eye to catch the actual speed of the motion. Golfers who follow this advise will have great difficulty developing the correct action because the required accelerations will not be produced. As a general point, the golf swing is full of illusions. This makes it dangerous to blindly copy good players.

Concept Communication

Before a motor skill like a golf swing can be improved, the student must understand the concepts which the coach is trying to communicate. Without effective communication, little progress is likely to be made. It has been shown that people use three methods of acquiring information for the learning of motor

skills. The relative importance of these methods varies considerably between people. For a complex skill such as a golf swing, it has been found that the use of all three methods is desirable, even necessary.

Auditory

Verbal communication is generally an ineffective way to learn motor skills. Differences in the use of words or phrases often lead to misunderstanding. Auditory cues are best used as a supplement to other methods.

Visual

Many types of visual communication can be used. Common examples are mirrors, demonstrations, videotape, photographs, computer imaging. All of these will be used extensively by your golf swing coach.

Kinaesthetic

With this method of communication, the golfer is moved through the required motion by physical manipulation from the coach. This enables the golfer to develop an internal feel of the motion. The majority of people learn most effectively by a combination of visual and kinaesthetic methods.

Factors Effecting Learning

There are many things that can effect how rapidly a skill is acquired. Motivation and the provision of feedback are the most important of these. Expert teaching cannot compensate for a student who lacks the desire to learn. If the goal setting processes have been correctly addressed, motivation should not be a problem. Everyone has bad days, but any persistent motivational problems must be addressed. Failure to do this will waste a lot of time and may impede the progress of others. The provision of feedback from the instructor to the student has a major influence on learning motor skills. The optimal amount of feedback depends on the particular stage of development of the student.

Stages of Motor Learning

Although many skills are required by the game of golf, all golf shots are derived from two basic motions. These are often called a double lever action and a single lever action. As the required distance of the shot increases, there is a natural change from a single lever to a double lever motion. This change occurs in the transition between the long chip and the short pitch. Both of these motions need to be trained correctly from the beginning. These motions are synonymous with the inherited skills of walking and running.

The acquisition of a motor skills such as a golf swing occurs in three stages. For optimal improvement each of these stages requires a different approach to learning and practice. A description of these stages and a broad outline of appropriate practice strategies this is given below. The text below refers to both the single and double lever motions.

Verbal-Cognitive Stage

This first stage of acquiring a motor skill is concerned with the transfer of information from the coach to the student. This will involve a lot of discussion, demonstrations etc. It is crucial that the student understands exactly what is supposed to happen during the various phases of the swing. To this end the swing will be broken down into its constituent parts. Once the concept has been understood, the student's task is to produce a swing which exhibits of correct characteristics. The initial attempts will be crude at best, primarily because the conscious mind is controlling the motion. The aim of the initial practice is to get the pattern of movement correct. The early swings will form the basis of the motor program that, given enough practice, will become an automatic process. As such, the pattern of motion is far more important than what happens to the ball as a result of the swing. Learning to dismiss the flight of the ball is a skill that should be cultivated from the beginning.

The instructor's task during this stage is to correct gross errors in the golf swing before they become entrenched in the motor program - Some of the methods used to achieve this are -

- physically moving the student through the required motion
 - providing many demonstrations to enable copying by the student
 - providing a lot of feedback on the quality of the swing
 - keeping all instructions simple

The student will have finished with this stage when he/she has an accurate concept of the various phases of the two golf swings, and be able to produce swings that are sound in terms of their basic movement patterns. The ball response is irrelevant!

Motor Stage

The aim of the motor stage is two fold. The basic movement pattern developed in the verbal-cognitive stage must be practised and refined, and to develop the ability to gain control over the ball response.

These are two quite different tasks and different practice techniques are required to optimise learning. It is important for the student to appreciate the difference between performance and learning. Practice which optimises learning is quite different to practice which maximises performance during practice. It has very little transfer to the golf course. Practice which is varied correctly - will provide far better learning for the end task - playing on the course.

For developing the motor program for the golf swing, the principle of random practice is used. This principle requires that several aspects of the golf swing are targeted for improvement (three is a good number), and practice is cycled through these tasks during the practice session. For distance control the principle of varied practice is implemented. This principle is simple. When learning to hit balls to various distances (as in chipping and pitching), never hit two consecutive balls to the same targeted, even if gross errors occur. This sounds easy but is very difficult psychologically for a golfer to do.

At the end of the motor stage the student will have a range of well developed, though immature, golf strokes. Although these strokes are all based on two fundamental motions, the variations that separate such strokes as the putt and chip will be evident. Similarly, the ability to control the ball response will be crude, but established.

Autonomous Stage

When a golfer enters the autonomous stage the swing is an automatic response, requiring no conscious attention from the golfer. Once triggered, the whole motion is controlled by a sub-conscious motor program. The main task of the golfer during this stage is to continue to improve the motion. Such improvements, though, will take much longer to effect because the existing level of skill is already quite high. The golfer should also strive to incorporate the pre and post shot routines into the motor program. This is similar to a gymnast doing long sequences during a floor routine as a single motion. The advantage of this is that the motion that precedes the swing will be more consistent, therefore starting the swing from a more consistent physical and mental state. The more consistent that the motion prior to shot execution is, the easier it is to build automaticity.

There are two other important aspects of performance that are associated with the autonomous stage. These are the ability of the player to detect their own errors and the maturity of the swing. Both of these are very important for elite players. Without the ability to detect errors, a golfer would always be dependent on the coach to provide feedback on the quality of the motion. Swing maturity is distinct from swing quality. Many young golfers have technically good swings which are quite immature. Because of the precision required in a golf swing, a substantial maintenance effort is required. As the level of maturity increases, this maintenance requirement decreases. In order for improvement to continue, it is essential that a golfer always exceeds the maintenance level of the particular skill. This concept is closely linked to the stages of development (training to train, training to compete etc. discussed earlier in this document).

Practice Methodologies

This section is concerned with the practicalities of practice. The whole idea of practice is to obtain the maximum long term performance improvements for the time spent. It is worth putting considerable effort into the various aspects of practice. Designing effective practice is a very complex issue. The discussion which follows gives a set of practical guidelines. Your instructor will expand on these and customise them for each golfer.

Preparation for Practice

To get the most out of training, it is important that your body and mind is suitably prepared.

Physical Warm Up

The Physical warm up consists of exercise designed to prepare the body for the particular practice to be undertaken. For physically low intensity practice, an appropriate set of stretching exercises are required. For practice involving the

full swing, in addition to stretching, exercises which elevate the body temperature should be employed. If this is not possible, the amplitude of the swing should initially be small and only increase as the body warms up and “accepts” the motion without strain. A complete set of exercises is contained in the module devoted to physical preparation. The following are a few examples of typical exercises.

- jogging, star-jumps, skipping, arm circles
- stretching, which targets all major muscle groups and the smaller muscles important for golf

Physical warm up has implications beyond the optimisation of practice. The major one is injury prevention. The best way to ensure a long, injury free, golf career is to religiously adhere to warm up procedures. The module concerned with physical conditioning addresses these issues and should be studied in detail.

Mental Warm Up

To obtain a good training result, practice must commence in the right frame of mind. The following techniques will help achieve this.

1. Define a goal to be achieved during the session. This goal must be measurable and written down.
2. Visualise the activities of the practice session before it commences.
3. Focus on the session at hand, not on what has already occurred or will occur later.

The module devoted to mental skills expands on this information.

The Practice Period

A practice period is defined as a period of approximately thirty minutes. This is approximately the time that most people can maintain maximum concentration. The actual time will vary from around twenty minutes to forty-five minutes. It will soon become apparent what this is for a particular golfer.

The actual activities of the training period will depend on many things – the ability of the player, the phase of training etc. Whatever these are, however, the principles of random and varied practice should be adopted. For a thirty minute training period, a good routine is as follows. Pick three aspects of the skill being practiced. Devote five minutes to each one in turn, and then repeat the exercise. If the task involves development of touch, vary the target distance for each shot. Remember, the object is to maximize long term goals, not to be good at a skill in practice. Your instructor will help design appropriate activities for your practice periods.

The Practice session

The practice session is a number of practice periods strung together. There must be a short rest interval after each practice period. The required rest is approximately five minutes, and will vary for each golfer. There will usually be two, three or four practice periods in each practice session. If more than this is attempted, the quality of practice is likely to fall significantly. Before a new practice session is attempted, a major rest interval of at least half an hour is required. If maximum effort is being expended during practice these rest intervals will be found to be essential.