Aspects of Learning Issues Relevant to the Chiropractic Adjustment

Christopher J Good, BA, DC, MA (Ed) Cand
AngloEuropean College of Chiropractic
Bournemouth, England

Abstract

It is important that the process of learning psychomotor skills is explored in depth by chiropractic educators so that these critical skills can be taught effectively. The learning of psychomotor skills is a complex phenomenon which is highly dependent on the environment in which the skill is learned and the inherent psychomotor skill learning capacity of the student. The tutor can have a significant impact on student learning by understanding the mechanisms of skill performance and seeing that the student receives proper feedback (both knowledge of results and internal feedback). Ultimately however the power of psychomotor learning lies within the student and is directed by his innate ability to feel, process, perform and analyze (the operational perspective). The purpose of this paper is to examine aspects of psychomotor skill learning as they pertain to chiropractic education, in particular the art of spinal adjusting. Key Words: Learning, psychomotor skills, manipulation, chiropractic education, manual medicine

Introduction

The practice of a healing art can be broken down into several main components: anamnesis, examination, diagnosis and treatment. Anamnesis and diagnosis are primarily cerebral events. In the former the practitioner uses the mind to execute the process of withdrawing information. In the latter he/she draws conclusions based upon all of the information collected from the anamnesis and examination procedures. Physical examination is normally a more manual event and involves a certain amount of practitioner dexterity depending on the specialty. Treatments are normally dependent upon the type of practitioner. They can be performed by the patient (exercises) or by the practitioner (surgery manual therapy). In the case of the practitioner who largely uses his hands during the examination and treatment pla
of the doctor-patient encounter, a high degree of psychomotor skill is usually required in order to achieve the desired outcome.

The psychomotor learning literature has been used by such professions as physiotherapy, nursing and occupational therapy in order to gain an insight into improved learning methods for their students and treatment for their patients. It is the purpose of this paper to give chiropractic educators a greater understanding of some of the current concepts of psychomotor skill learning as well.

The term psychomotor (also known as motor) refers specifically to activities which have to do with voluntary movement. This word reflects the great importance which the central nervous system has and as such is the term of preference. Psychomotor learning is differentiated by Singer from cognitive (to know) and affective (to feel) learning. He defines it specifically as that which is reflected or inferred by a relatively permanent change in performance or behavioral potential resulting from practice or past experience in the situation. In this case the subject has learned to execute movements in a number of organized motor acts. Gagne, relates to these unitary motor acts as psychomotor skills and maintains that they are the elements which make up part of a more comprehensive activity such as skiing or playing soccer, or as is the case with chiropractic, performing an adjustment.

Technique and Skill

Technique can be defined as that pattern of movement which is technically (theoretically) sound for the particular skill and which is an integral part but not the whole part of that skill. Simply put, it is the method of doing an activity which is part of a skill. To be a good technician does not necessarily mean that the individual is skillful though. For example, a student may perform a particular maneuver well on a fellow student, but not be able to perform that same maneuver on a patient who is in pain. The student is technically proficient but not truly skillful.

Robb noted that defining the term skill can be done through one of two viewpoints, from either a descriptive or operational perspective. The descriptive definition focuses on the activity and goals involved in task performance, and asks “What does the activity look like?” It addresses the quality of that performance as a subjective evaluation. In this context the term skill has been defined as “the learned ability to bring about predetermined results with maximum certainty, often with the minimum outlay of time or energy or both.” This definition implies that there is a definable goal involved when performing a skill. The quality of performing that skill however, can either be high or low depending upon how long it takes an individual to achieve that goal and how much energy an individual expends during the attempt(s). More importantly however, the definition states that learning is involved in the process. As such teaching strategies can have an important impact on the acquisition of skills.

An operational definition looks at the specific mechanisms involved in performing a task, not simply the end result. It addresses the receptor-processing-effector-feedback process and asks, “How is the activity actually performed?” An operational definition for skill based on the work of Flits is “the ability to perform an act in which the receptor-effector-feedback processes are highly organized both spatially and temporally.” This definition implies that how an activity takes place is considered in depth. In this context skill is examined from the point at which the sensory organs are first stimulated, to the processing of that information, through the performance of the activity and finishing with the mental feedback and the impact of that feedback on future performance. This perspective is much more useful in understanding the entire act of learning and performing a psychomotor activity. As such it is most useful in the educational setting.

When teaching psychomotor skills, understanding the operational perspective is critical. In chiropractic education, for instance, this gives the teacher a tool which he can use to more systematically evaluate a student who is trying to learn to become skillful at performing a particular adjustment. By examining each component of the adjustment in light of the pathway in which the student performs it, greater skill can be accomplished once proper instruction is given.

For example, while a student may learn the act of placing his hands in the appropriate position, the ability to successfully adjust (cavitate) a joint takes a certain amount of speed and finesse. Often the problem lies in achieving the correct pre-thrust tissue tension (PITT). This is done by removing the skin slack and joint slack early on in the adjustment set-up and without it a truly skillful adjustment is difficult to perform. The PITT psychomotor act has its own receptor-processing-effector-feedback pathway. Sometimes the problem may lie in sensing the tissue tension. This would be a receptor problem in which case the student should perform exercises to increase his sensory sensitivity. Sometimes the student can successfully reach the elastic barrier of the arm and hand muscles prior to the impulse. This would be an efficiency problem and in this case the student should be directed to perform strength exercises which are relevant to the perspective and hence better skill can be accomplished.

Learning

It has been stated that psychomotor skills are learned. Learning has been defined as the internal neural process which occur whenever a change in performance does not due to growth or fatigue, exhibit itself. It is important to recognize that not all learning adds to skill. Any learned pattern of behavior which is not consistent and predictable in performance is not learning. It is easy enough to leam habits which will not apply in poor skill.

When first learning how to adjust, students often develop bad habits which some early success has been gained in the lumbar lateral recumbent adjusting, case the exact position of the patient adjusting table is very significant. A patient positioning can result in patellar or unwanted areas of joint cavitation. The doctor’s position as the adjustment is performed is also important. If he does not assume a protected posture, either low back or shoulder is liable when the dynamic impulse (thrust) is applied.
shoulders posteriorly in order to achieve cavitation. This can lead to a sprain of the patient's spine as well as a strain of the practitioner's shoulder girdle. The adjustment set-up is not taught this way, but the bad habit has developed over time. Therefore observing the adjustment set-up periodically throughout the learner's entire course of study and giving proper instruction will prevent such injuries.

This focus on bad habits is an important one. Not only do they cause potential harm to doctor and patient, they also will limit the full potential an individual learner may achieve. Certainly proper technique which is firmly based on the learning of fundamentals and instilling good habits will allow the practitioner to treat a wider range of patients with varying circumstances. The instructor must take his time in the beginning to avoid the ingraining of bad habits, even though the learner may complain that the pace of instruction is too slow. The alternative is that the bad habit is overlooked and thus becomes very ingrained. This is simply the result of facilitation by the nervous system (ie the more frequently a pattern of signals pass through the nervous system, the more capable the nervous system becomes in transmitting those signals). In fact there is some evidence to suggest that this phenomenon is the result of actual physical changes to the nervous system itself. Any attempt to change a long standing habit would therefore require overcoming the physical change in the nervous system as well. If a student picks up a bad habit early on, at some point in time skill improvement will reach a plateau (periods of arrested progress). If the bad habit is well ingrained that plateau might last for a very long time (or for life) and lead to immense frustration.

Learning Curves

Plateaus are a common phenomenon in the learning of psychomotor skills. They will normally occur between periods of noticeable improvement. Other typical patterns appear as well in learning curves. These patterns are determined by the individual's own learning capacity, their physical aptitude, the arduousness of the skill and of course the teaching strategies involved. Knapp provides a good summary of learning curves based on the work of a number of previous investigators.19

Figure 1. The curve for an average student performing a simple task

![Learning Curve Diagram](adapated from Knapp, 1976)

As can be seen in Figure 1, a simple task performed by the average student will be learned very quickly and the level of skill attainment will reach a high plateau early on. The initial part of this curve shows a period of rapid increasing gains (acceleration) and the latter part shows a period of decreasing gains (negative acceleration) which ultimately becomes a plateau. This plateau is acceptable to the student and the instructor because the task is performed at a very skillful level. The plateau will not effect the student negatively and if maintained, is actually a desired outcome. This sort of learning would be expected of a student engaging in the patient positioning component of the adjustment, which is a relatively simple psychomotor skill not requiring much manual dexterity.

The first learning curve in Figure 2 represents a task of moderate difficulty (such as giving a supine cervical adjustment) performed by an above average student. This type of student will learn rapidly and will exhibit a learning curve similar to that in Figure 1, yet will show dips in performance depending on a number of factors. Variables like student concentration, patient differences (stiffness, elasticity, size, pain tolerance etc), equipment, discomfort of student and stamina all have an effect. It would be important for the instructor to examine these factors with the student so such dips in performance could be avoided.

Figure 2. A moderately difficult task attempted by above and below average students

![Learning Curve Diagram](adapted from Knapp, 1976)

The second learning curve in Figure 2 represents the same moderately difficult task performed by a below average student. In this case many trials may go by with little success until at some point "something clicks" in the learner. A period of rapid gains then occurs, but due to the student's lack of natural ability, plateau and dips are commonplace. Eventually however, with time, practice and proper instruction the student should be able to perform at the high level achieved by the above average student. This type of student needs to be encouraged to practice regularly and should be congratulated more frequently on their achievements so as to maintain their enthusiasm. Also knowledge of results (to be discussed) is critical for this type of student.

The first learning curve in Figure 3 represents the very difficult task (such as performing a side-lying sacroiliac adjustment) done by the average student. The initial part of the curve shows steady increasing gains and then plateaus at some point. Whether this is the point of the learner's physical limitation or whether it is caused by some other factor is a matter into which the instructor really must assent himself. A careful eye with constructive criticism is essential. The simplest bad habit not detected can leave the learner at this plateau for a lifetime. In the end the student may discard performing the task and opt for some other method in order to try and achieve this clinical result. And once a high success rate is achieved for a difficult task, it is important to explain the pitfalls of complacency or lack of enthusiasm which might allow the learner to lapse from this higher level of performance.
The Journal of Chiropractic Education

September, 1993

65
Internal Feedback

Internal feedback from psychomotor skills transmitted by sight, sound and sensation is a critical component of internal feedback. At the Anglo-European College of Chiropractic only the set-up of an adjustment is taught. In doing so students learn to adjust each other in their early morning study sessions at the university or at home. Naturally the consequences of this range from a very few satisfactory adjustments before they enter the clinic, while most do not because they pick up bad habits which are very hard to break. Also because this is unsupervised adjusting at least an early stage, many students get hurt.

It is the author's experience and observation that this problem has existed for many years, probably since the beginning of chiropractic education. Despite warnings and regulations issued from above (ie the administration) the situation has not changed. To ignore that the problem exists only allows it to continue to thrive. Adding criteria to those who get caught simply drives them more deeply underground (students are already faced with expulsion if caught). If we have learned anything from similar social dilemmas (prohibition for example), it's that when educated people reject a moral or ethical rule because they are willing to risk the penalties or believe they won't be caught, trespasses will commonly occur. This is particularly true if it is an emotive issue which the transgressor views as victimless. Instead of authorities creating conflict, they would achieve their own objectives better through compromise. In these cases the academic board of the college is considering changing the regulations for supervised adjusting by allowing it earlier in the curriculum (ie during 2nd year). This would only serve to improve student adjusting skills (by increasing the impact of internal feedback and KR on the learning process) and decrease unsupervised adjusting and its consequences-a beneficial outcome for all.

Conclusion

In conclusion it can be said that the learning of psychomotor skills is a complex phenomenon which is directly dependent on the environment in which the skill is learned and the inherent psychomotor skill learning capacity of the student. The teacher has a significant impact on the learning environment by giving knowledge of results to the learner in the proper manner. Also the regulations of the classroom can indirectly affect learning by promoting bad habits decreasing the amount of feedback available. This issue needs to be addressed on behalf of the learner as well. The inherent learning capacity of the student is primarily a genetically fixed quantity but fulfilling that potential can be significantly affected by both learner and teacher. Ultimately however the power of psychomotor learning lies within the student and is directed by his/her innate ability to feel, process, perform and analyze. Once these concepts are appreciated, learning and improving psychomotor skills becomes a simpler task for both teacher and student.

References


September, 1993


January 28-30 Faculty Roles and Rewards. New Orleans. AAHE. (202)293-6440.

February 7-8 Faculty: Evaluating College Faculty. Seminar. Orlando, FL. Kansas State Univ. (800)255-2757; FAX(913)-532-5657.
