



Learning Procedural Skills in Dentistry – A Structured Review

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Abstract

Professional learning of the science of dentistry is complete only when the related skills are acquired. The number of skills to be mastered are many those span from a single tooth restoration, replacement of the entire dentition to the highly complicated surgical procedures. Skills are included under the psychomotor domain and teachers have tried to implement different methods of imparting 'procedural learning'. Conventionally, a procedure is demonstrated and the students observe it. Then they are asked to repeat the skill but it is difficult to ascertain whether the student has understood the procedure in the context of its relevance. This review considers different instructional practices suited for the learning of procedures.

Keywords: Procedural Skills; Competency; Feedback; Peyton's Four-Step Approach; Spaced Practising; Pendelton's Rules of Feedback

Introduction

Teachers of dentistry who are aware of the term 'Objectives' will remember the name of Benjamin Bloom who formulated the 'Taxonomy of educational objectives' in the year 1956 [1]. The objectives were categorized under three domains viz. Cognitive, Affective and Psychomotor in a hierarchical model. Towards the end of twentieth and the beginning of twenty first century, Bloom's taxonomy was modified in the hierarchy of cognitive domain and the nouns were changed to the verb form. Lorin Anderson made significant contributions in revising the cognitive domain [2]. Krathwohl was responsible for revising the Affective domain [3]. Simpson, Harrow and Dave modified the Psychomotor domain to its present form [4]. Whenever the term objective is referred to, it meant cognitive domain for most of the teachers and in fact it was over emphasized. In significance, affective domain received the attention next to cognitive. Psychomotor domain received the least attention and only very limited research has been undertaken on the methods of psychomotor training which is of paramount importance to the dental profession. The number of skills which the students have to get trained is very high when compared to that of

other health related courses. For treating a patient with complete dentures, a student has to get trained in nearly eighteen steps with an average of ten checking points for each step. This clearly shows the importance of skills training in dentistry [5-7].

Training under psychomotor domain

Training under the psychomotor domain involves different steps. Dave's description is the most commonly cited interpretation of training under psychomotor domain. The teacher demonstrates a skill which the student observes and tries to imitate. Then the student practises under the supervision of the teacher. At this level the performance may not be of high quality [6].

One example is the making of an alginate impression of a dentulous mouth. Usually this is demonstrated on a phantom head. A small group of students will assemble around the teacher who will brief them on the requirements and the usefulness of the impression. The material will be mixed and loaded on to the previously selected tray. The description and the demonstration will happen simultaneously. This was the common practice followed in Indian

teaching institutions of dentistry. Slowly the instructional videos that appear in the YouTube started taking over the instructional system. Students are expected to practise the skill under the supervision of the teacher. The introductory instructions and the observation of the demonstration will go into the memory of the student and help to practise the technique. While the student is practising, the instructor observes carefully and timely corrections are suggested and this results in bringing accuracy in the product that is made. Making an impression, fabricating a cast, preparing a mould, preparing a cavity in a large sized model, preparing a tooth model to receive a full coverage restoration are all skills, the students should master. Almost all basic skills are instructed and trained on models.

Different exercises are designed to give proficiency to the trainee. Some of the exercises are repeated for a number of times so

that the skill is performed with ease and accuracy. On successful completion of the preclinical exercises, the trainees are brought to the clinic to perform on patients. Within a period of two years, the students are gaining proficiency by treating a number of patients presenting with different situations. At the end of the predetermined training period, the students can decide on treatment plans befitting to the situation. A trainee who has attained proficiency can perform with ease and the skill will come to him/her naturally at any point of time. The training under psychomotor domain aims at that level of proficiency in our professionals. Now differently designed simulators are available for different procedures like oral anaesthesia, tooth preparation, paediatric and adult models for radiography etc. Once these simulators were called 'Phantom heads' but now they are designated as mannequins (Figure 1-3).



Figure 1: Mannequin used for implant training.

(webp. <https://www.dentalez.com/product/surgio-hyper-real-implant-surgery-partner/>)

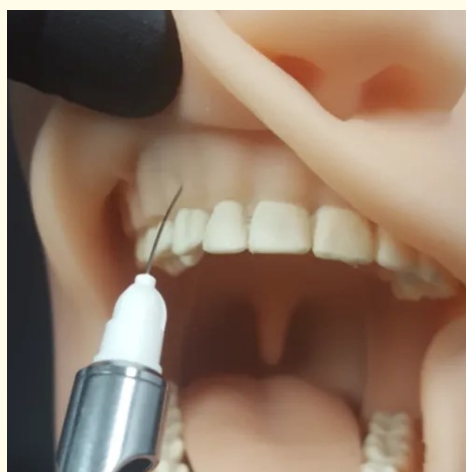


Figure 2: Oral anaesthesia dental mannequin.

(webp. <https://m.indiamart.com/proddetail/oral-anesthetic-dental-training-mannequin-made-in-usa-22480493262.html>)

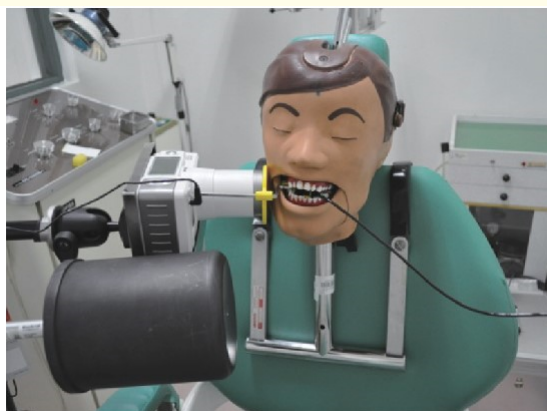


Figure 3: Radiology mannequin.

([https://www.semanticscholar.org/paper/The-reduction-methods-of-operator%27s-radiation-dose-Cho Han/2b6523392b10812330c9f745e0243aa0ba0bbb2d/figure/6](https://www.semanticscholar.org/paper/The-reduction-methods-of-operator%27s-radiation-dose-Cho-Han/2b6523392b10812330c9f745e0243aa0ba0bbb2d/figure/6))

Large sized tooth models

Before doing tooth preparations, using phantom heads, some institutions expose the students to large sized tooth models. Cavity and tooth preparations are done on them and restored with modelling wax. The design of preparation was clearly understood. Students could understand the gingival termination and its variations very well. Plaster models were not environment friendly and hence motor driven trimmers could not be used. Hand trimmers made the job laborious and students disliked it. If the model fell down ac-

cidental and broke, the students were asked to start from the beginning. As a solution, the authors thought of making wax models and for preparations large brass tools which could be heated, were made. Wax models were prepared with mildly heated tools fitted on a dummy handpiece. The fourth author of this review took the initiative in the fabrication of the tools and made available to the students. The advantage of wax model was the repairability. Once the preparation was completed, it was duplicated in plaster and wax restorations were made on them. Acrylic restorations were also tried (Figure 4-8).



Figure 4: Tool kit for large sized tooth models (Murukan's Prefix).



Figure 5: Occlusal reduction on wax model.

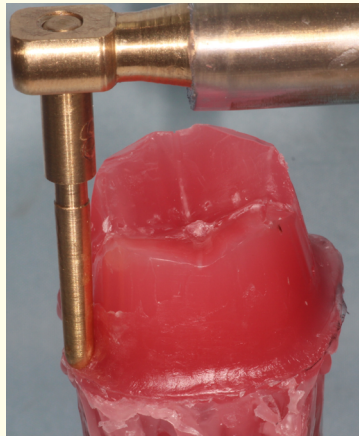


Figure 6: Axial wall reduction using heated brass tool.

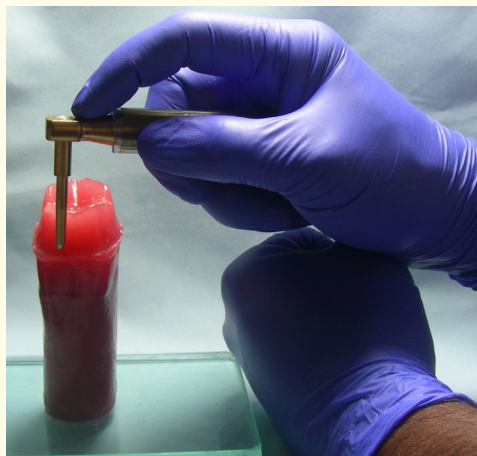


Figure 7: Operator holding the tool.



Figure 8: Prepared large sized tooth converted in acrylic along with unprepared tooth.

Examples of objectives under psychomotor domain

Every educational programme will have pre-determined objectives under the cognitive (knowledge related), affective (attitude related) and psychomotor (skills related) domains. This review mainly focuses on skills training and a few examples of objectives under psychomotor domain are given.

- Make an alginate impression of a dentulous mouth using perforated tray as demonstrated.
- Give an inferior alveolar block in a patient requiring mandibular molar extraction as demonstrated by the teacher
- Make impressions of patients who are attending prosthodontic clinic for removable partial dentures under the supervision of the teacher.
- Perform dental extractions on patients who are attending the oral surgery clinic and the teacher is supervising.
- Does oral examination of a patient, decides prosthodontic treatment required for the patient and does necessary referrals confidently and proficiently in the prosthodontic clinic.
- Confidently controls the bleeding from lower lip injury in a young patient who had a fall while playing volley ball in the college and reported to the casualty department.

Objectives 1 and 2 are examples of imitation – imitating the teacher who has demonstrated; 3 and 4 are examples of practising under the supervision of the teacher who is present in the clinic and 5 and 6 are examples of proficiency and the candidate can exhibit high degree of the skill. If the objectives are clearly stated and both the teacher and the students are aware of them, evaluation or assessment will be done without any bias. The objective statements should be relevant to the profession and the society. Usefulness of learning a particular technique should be convincing to the learner that it is going to help him in future while practising. It should be feasible for the learner to acquire the skill within the learning period and the learner should be convinced that learning is a lifelong process and teachers of the present day no longer insist on ‘know everything under the sun because, this is a world of team work. The objectives mentioned above are clear cut statements and no element of vagueness has crept in. While performing the skill, the instructor should be able to observe the changes that has happened in the trainee and some elements of measurability will be added to the objective like: time factor within which the skill has to be performed, affective elements like without causing pain or discomfort and precision elements like accurately or without mistakes. While formulating objectives in dentistry especially on psychomotor domain, the following qualities must be ensured: relevant, feasibility, clarity, observability and measurability [8,9].

Relevance of doing a skill repeatedly

Will Durant, the famous American Historian and Philosopher stated: ‘We are what we repeatedly do. Excellence, then, is not an act, but a habit’. His words are quite befitting to the training methods adopted in psychomotor domain. In dentistry, certain techniques are instructed to be done repeatedly for a specified number of times and in the dental college jargon, it is a ‘quota’. When a skill is performed repeatedly, that behaviour progressively becomes automatic and later a habit. By repeating the habit, changes do happen in the brain like improved signalling and neural connections. When a habituated act is repeated, the same set of neurons get triggered and the activity becomes automatic. Along with that the quality also improves.

Some trainers raised a doubt that by repeating a skill, the ease with which it is done might improve but the quality improvement cannot be enhanced. The answer is an experiment done by Jerry Uelsmann, a professor of photography of the University of Florida. He divided his class into two groups. The first group was instructed to make as many photographs as possible within a stipulated time. The second group was instructed to make the best quality photo. The first group produced many photographs with good quality. The second group produced hardly one or two photographs but the quality was mediocre. Repetition definitely adds to learning and naturally the quality improves. While undergoing the course in dentistry, students may find it difficult to cope up with the training initially. But later when they practise, they will understand the value of repetition [10,11].

Instructing psychomotor skills in the present world

In the early stages, dental and medical education was imparted through apprenticeship. Students were selected by the preceptor after administering a series of tests to determine whether the candidate is fit to receive the knowledge essential for becoming a health professional. Once accepted, the student lives in the home of the teacher. Observation was an essential quality required for the student and formal classes were minimal.

The traditional method of instructing skills was known as ‘see one – do one’ where teacher demonstrates a procedure along with a description and the students were asked to proceed with repetitions. This approach is attributed to Halstead of 1904 who was a famous surgeon [12]. Later Dave has elaborated this approach where the teacher demonstrated the skill for the student which he/she repeated many times under the supervision till the student gained proficiency [6]. Demonstration sessions were partly a lecture class and there was very little scope to know whether the student has acquired the skill or not and the chances of correcting the errors as and when it happened were minimum and these were considered as the limitations of the instructional system. When formal institutions were established for dentistry, training of skills were undertaken through hands on practice, effectively assisted by mannequins. A set of preclinical exercises were also designed. Changes have come in the instructional methods with the effective use of videos, computers, virtual reality and augmented reality. One factor that remained unchallenged is the role of the teacher who demonstrates the procedure to the student. Research has been undertaken on the method of demonstrations and how the student learns the skill [13].

Teaching procedural skills using Peyton’s four step approach

One of the pioneering documents on teaching skills was contributed by Peyton in 1998. This method consists of four steps:

- Demonstration – The skill to be taught is demonstrated by the teacher but unlike in conventional methods, explanations or a commentary on the procedure is avoided.
- Deconstruction – In this stage, the skill is again demonstrated by the teacher in a slow pace and after breaking the process into different smaller steps and explaining each step exhaustively. One skill divided into different smaller steps is the reason for naming this stage as deconstruction.
- Formulation – Here, the teacher will demonstrate but according to the instructions given by the student who has witnessed both the demonstrations. The teacher can find out whether the student has learned the skill and hence this stage is otherwise called as comprehension.
- Performance – The student will demonstrate the skill without assistance and simultaneously describe each step [14].

Five step method of teaching clinical skills (George and Doto)

George and Doto have formulated a five step method of instructing the clinical skills as follows: [15]

- Step 1. The student should understand the importance of the procedure in the delivery of health care. Necessary information and knowledge should be imparted beforehand.
- Step 2. The procedure should be demonstrated as it is normally performed in the clinic or in the lab. The teacher will not talk during the demonstration; so, the emphasis is on the visual memory and no distraction is caused due to listening. The picture that is registered will help the student while he performs and to help him to compare with his own performance.
- Step 3. The teacher will repeat the procedure and takes time to describe each step. This will help the student to understand the sequence of the procedure. Doubts can also be cleared.
- Step 4. Students are asked to describe the procedure step wise and the teacher evaluates whether the student has understood the procedure and can recall the steps involved.
- Step 5. The student performs the procedure under the careful observation of the teacher who will give feedback and coaching. After successful completion of the procedure, the student has to practice till the proficiency is achieved.

Nicholls method of Teaching psychomotor skills

Four step and five step methods of instructing received wide acceptance and many modified versions were also tried. Skills are better learned when they are instructed in smaller segments in a sequential fashion. Then the students will feel that there is a logical relevance in learning it. Educationists are of opinion that the four and five step methods are efficient for simpler skills but not for complex skills. A complex skill consists of more than seven skill elements and it is not easy to learn, retain, recall and execute such skills when required [16]. Nicholls, *et al.* have formulated a method of instructing complex skills containing eleven steps [17].

1. The task is analysed to find out the cognitive load involved

Working or short-term memory is used to retain limited quantity of information and it is readily accessible to be used mainly for comprehension and execution of cognitive tasks. In working memory, only limited quantity of information can be stored. When a procedure is demonstrated, the student observes it and it is stored in the short-term memory [18]. If the procedure involves too many steps, the short-term memory gets overloaded and the learner loses the attention capacity. The demonstration should be done in steps and the number of steps should be limited to 5-7 in one session. By repeating the procedure many times, new neural connections are established and the information is stored in the long-term memory. As long as the skill is used, it will remain in the memory. An endodontist who generally practises his speciality may find it difficult to do a dental extraction even though he has done it in the graduate days. Before conducting the instruction, the

teacher should plan the session to limit the steps to five or seven. If not possible the sessions can be divided so that over loading of the short-term memory can be avoided. Observing and listening to explanations of the teacher and if that belong to too many steps, the student will suffer from information over load and the confidence level gets eroded [19,20].

2. Before the start of the instruction, the learner's needs and the skill level should be identified

To learn a skill, the student should have a need for it and the student should have acquired some basic knowledge and skills. If a final impression for complete dentures is demonstrated, we expect the student to understand the rationale or theoretical background of it and about the materials used. The student should have acquired the skill to manipulate the materials, make the casts and the custom made trays. The teacher should identify the skill level of the student so that the session can be planned effectively without causing information overload and can avoid unnecessary repetitions. Asking a few questions to the student and verifying the student records can give a clear idea on the skill level of the student [17].

3. Impart clear concept before the skill is demonstrated

Before the session, the student should get a clear concept of the step which will be demonstrated. If maxillary impression for completely edentulous individual is demonstrated, the student should know the importance of functional border moulding, which type of tray should be used, which material is used for border moulding and the subsequent lining impression, how the border tissues are manipulated and how to pour a cast or how to do scanning of the impression. If this information is given, it should be done well before the session. This step is known as pre skill conceptualisation [21]. This is equivalent to the step 1 of George and Doto [15].

4. Demonstration – Visualisation

The teacher provides a well rehearsed demonstration without any verbal accompaniment. It will leave an indelible image of the demonstration without any other sensory interventions like auditory inputs or tactile sensations. The image that is obtained and retained in the brain will serve as a template to compare the student's own performance and diagnose errors that possibly might have occurred. This step is equivalent to the step-1 of Peyton and George and Doto's step-2 [14,15].

5. Demonstration with verbalisation

The teacher repeats the demonstration along with step wise description. Peyton's 'deconstruction' and George and Doto's step – 3 are similar to this step. If the description is too elaborate, there is a chance to get the short term memory overloaded. The optimum description pattern should be used by the teacher to get undivided attention from the student.

6. Timely correction of errors

Students who do not follow the instructions of the teacher meticulously, may commit errors while practising or while performing. If the error is observed, the teacher should intervene and make the corrections; otherwise, the student will continue to perform the skill with errors and chances are that it will be encrypted in the long term memory. In dentistry after the preclinical training, trainees do treat the patients and if errors are not rectified with immediate effect, it may have a long lasting disastrous effect. Once an instructor was demonstrating compression moulding technique to fabricate heat cure acrylic denture. While making the mould, the instructor used Vaseline as the mould separator. The student failed to notice that the instructor applied Vaseline only to the plaster surface. When the student was making his own dentures, he applied Vaseline over to the wax surface also. The student was disappointed to notice that the denture had a rough surface and he had to do a lot of grinding and polishing to get a presentable surface. The lasting impression he had was that there is no use in doing wax carving elaborately. This reminds us the proverb "For want of a nail, the kingdom was lost".

7. Overzealous verbal guidance during skills training

The teacher need not continuously elaborate or verbally instruct the student. This will act as a distractor. However, timely corrections can be made using discrete vocabulary. While performing the task, if too much communications are made, the short term memory will be over loaded and thereby interrupting the learning. More over the student will become over reliant on the teacher in performing the skill and the student will not become independent. Step 6 and 7 can be considered as an elaboration of Step 5 [16,17].

8. Student gives description of the task

After step 5, the student is asked to describe the skill step wise which the teacher evaluates. If the student can describe the procedure correctly, in every likely hood, the student will perform the skill very well. This step is equivalent to Peyton's step 3 and Geroge and Dotto's step 4. With Peyton, the teacher will demonstrate when the student narrates each step of the skill but with George and Dotto, there is only an evaluation of the narration of the student with timely corrections by the teacher [17].

9. Describe and perform the skill

Once the teacher approves the description, the student is asked to perform with the accompaniment of description. This is termed as verbalisation-performance. With this practice the skill learned will be stored in the long term memory and the recall becomes easier for the student.

10. Practise the learned skill

The learned skill should be practised many times and it will create a visual image encrypted in the brain. The encrypted image helps in visualisation, recall whenever required and gets the ability

to adapt the skill according to the requirement of the situation. A professional should not stop performing the skill for long duration. The skill should be practised in a spaced manner. This is the reason why senior teachers do demonstrations to junior students. Both the student and the teacher are benefitted by the demonstration sessions. Students should be advised to visualise the skill and do spaced practice. They are also advised to reduce carbohydrates in the food, get good sleep and to practise meditation [16,21].

11. Feedback given by the teacher

Feedback is an important component of skill learning next to practice. When the student exhibits the skill, the teacher should observe and refrain from making any comment till the performance is completed. The teacher asks for a self-assessment from the student. The student can start with giving positive points – what went well with the performance. The teacher also gives some positive feed back points. In the next stage, both the student and the teacher highlight some points which can be improved. Both of them can discuss and make it a good learning experience. The feed back session reinforces the learning of the skill. Pendleton., *et al.* who have developed this method of giving feed back is used for variety of situations in education and in working. Giving feed back and receiving feed back should be done gracefully. Self assessment and to receive the feed back have to be learned to learn as well as to nurture human interactions [22,23].

Discussion

When the student enters the lab where he (she) is going to get the instructions for the first time, his awareness about the skill is zero and the level of competence is also zero. Technically the state of the student can be named as 'unconsciously incompetent'. Now the teacher starts the instructions and the student becomes aware of the procedure but he knows that he cannot perform the task. This is the stage of 'consciously incompetent'. The awareness makes the student interested in learning. The student learns the skill and becomes competent by repetitions and this stage is known as 'consciously competent'. Once the student becomes proficient, he can do the procedure competently and without conscious effort. Whenever or wherever the student wants to do the procedure, he can do it. This stage is termed as 'unconsciously competent'. If the competency has to be maintained, the professional has to perform the skill periodically to prevent the possibility of decay in proficiency [14,24].

Learning of the skills in dentistry was based on (1) demonstration given by the teacher, (2) student imitating the teacher under supervision and (3) practising on the mannequins and patients to get proficiency. For years, this has been in practice amongst the health professions. In the Indian context, where 50 to 100 students are admitted every year, teachers do face practical difficulties to supervise each and every student during the performance of the

procedure. In the preclinical sessions, if an error is committed, the teacher will be able to correct it and to the maximum the phantom tooth can be replaced. But in the patient, error committed will have disastrous irreversible effect. A normal restorative cavity preparation, when the teacher evaluates might have got converted to an endo case. This can be prevented by continuous supervision only. In preclinical and clinical -procedural training sessions, the trainer should ascertain whether the student has learned the principles and acquired the skills required for the procedure. Peyton, George and Doto and Nicholls have put forward their methods of teaching the procedures. Based on all those established systems of teaching, the authors of this review propose a staged training system for the procedural learning.

- Before instructing the procedure, the teacher should make sure that the student is aware of the relevance of the procedure

and its usefulness. Make sure that the student has learned the background skills. Skill should be demonstrated in small steps in a sequential manner.

- Teacher demonstrates the skill to a small group and the students observe. Teacher need not elaborate verbally.
- The demonstration is repeated at a slow pace along with necessary description.
- Student is asked to describe each step and necessary corrections can be made. The teacher can demonstrate the skill, if necessary, along with the student’s description.
- Student performs the procedure and the teacher observes.
- Feedback can be given by the teacher based on Pendelton’s method.
- Student practices many times to gain confidence in the skill (Table 1).

Steps	Description of the step	Example
1.Pre demonstration briefing	In this stage, three things are to be achieved: 1.Knowledge requirement 2.Skills proficiency 3.Conceptual understanding	CD final impression related instruction: The student should know why this is done, know the materials and armamentarium required, acquired proficiency in making preliminary impression, fabrication of custom tray
2.Demonstration of the skill/ procedure	1.Teacher demonstrates without description-only visualisation 2.Demonstration repeated with verbal accompaniment and clarifications 3.Student describes each step and teacher corrects errors if necessary (Steps limited to 7-9) 4.Student performs under supervision	1.Checks tray extension, 2. manipulates border moulding material, 3. border moulding done, 4. manipulation of lining material, 5. impression completed,6. cleaning and 7. disinfecting the impression, 8. storage of impression Student imitates the teacher and performs under supervision
3.Practice and feedback	1.In the initial stages the student can describe and do the procedure 2.Later visualise and do the procedure 3.spaced repetition ensures proficiency 4.Self-assessment and feedback by the teacher based on Pendelton’s method	1.Practice is done on different patients requiring complete dentures 2.every time the student should visualise, describe and practise the procedure. 3.At the end of the procedure, the student describes what went well and the teacher tells what went well 4.The student tells what went wrong and how to improve. Teacher also tells what went wrong and how to improve 5.The feedback ends with a discussion and precautions to be adopted in the future. Corrections can be pointed out on the impression and photograph it for future reference
General principles to be observed	1.Errors must be pointed out and the correction technique should be suggested. 2.Verbal guidance by the teacher should be given with limited vocabulary and avoid repetitions. Unnecessary advice can be avoided	1.Tray exposure in the borders should be pointed out and the corrective methods should be described. 2.Extension, relief of frenii and the surface details should be pointed out as the approval parameters 3.Avoid verbosity in the description of the teacher

Table 1: Learning of procedural skills.

With this method, student can learn both simple and complex procedures. Dentist has to acquire a number of such skills and if the student can describe each step sequentially and demonstrate, we can be sure that the student has learned the skill.

Conclusions

Skills required for the practice of dentistry are learned effectively from a teacher through an appropriate demonstration. Each procedure is divided into seven or nine steps, so that the learning goes to the short term memory without difficulty. By practising the skill many times, the learning can be stored in the long term memory and can be retrieved as and when required. A professional cannot avoid the practice, otherwise there is a chance of decay in the proficiency. Conventional methods of training do maintain their relevance but they are becoming more effective with technologies like virtual reality and augmented reality.

Author Contributions

Conceptualization-K. Chandrasekharan Nair, Review of articles- Pradeep Dathan, Arya Nair, Revathy C V ; Initial draft preparation: Viswanath Gurusurthy, Murukan P A; Review and editing- K. Chandrasekharan Nair, Pradeep Dathan; Supervision – K.Chandrasekharan Nair.

All the authors have read and agreed to the published version of the manuscript.

Conflict of Interest

The authors have no proprietary, financial, or other personal interest of any nature or kind in any product, service, and/or company that is presented in this article.

Bibliography

- Bloom BS. Taxonomy of educational objectives - Handbook-I, Cognitive domain, David McKay Company Inc, New York (1956).
- Anderson L W and Krathwohl D R. "A taxonomy for learning, teaching, and assessing: A Revision of Bloom's Taxonomy of Educational Objectives". New York: Longman (2001).
- Krathwohl DR. Taxonomy of educational objectives - Handbook-II, Affective domain, David McKay Company Inc, New York (1964).
- Simpson EJ. "The classification of educational objectives: Psychomotor domain". University of Illinois research project No. QE 5 (1966).
- Harrow A J. "Taxonomy of Psychomotor domain". David McKay Company Inc, New York (1972).
- Dave RH. "Psychomotor levels in Developing and Writing Behavioral Objectives". (1970): 20-21.
- <https://prosthoguru.wordpress.com/2016/12/01/flow-chart-on-complete-denture-fabrication/>
- K Chandrasekharan Nair, *et al.* "Role of objectives in Dental Education - A Review". *Acta Scientific Dental Sciences* 6.2 (2022): 88-94.
- Ananthakrishnan., *et al.* "Medical education: principles and practice". 2nd edition, Published by NTTTC, JIPMER, Pondicherry (2000): 9-13.
- James Clear. "Tiny Changes, Remarkable results, Atomic Habits". Penguin Random House, UK (2018): 141-147.
- K Chandrasekharan Nair, *et al.* "Skills Training in Prosthodontics - A Report". *Acta Scientific Dental Sciences* 5.10 (2021): 109-112.
- Halsted WS. "The training of the surgeon". *Bulletin of the John Hopkins Hospital* 15 (1904): 267_275.
- <https://unicorndenmart.com/2023/09/11/augmented-reality-in-dental-training-a-new-age-of-learning/>
- Walker M and Petyon JWR. "Teaching in theatre". In: Peyton JWR, editor. *Teaching and learning in medical practice*. Rickmansworth: Manticore Europe Limited; (1998): 171-80.
- George J and Doto F. "A simple five-step method for teaching technical skills". *Family Medicine* 33 (2001): 577-578.
- Kantak SS and Winstein CJ. "Learning-performance distinction and memory processes for motor skills: a focused review and perspective". *Behavioural Brain Research* 228 (2012): 219-231.
- Delwyn Nicholls., *et al.* "Teaching psychomotor skills in the twenty-first century: Revisiting and reviewing instructional approaches through the lens of contemporary literature". *Medical Teacher* 38 (2016): 1056-1063.
- Sweller J. "Some cognitive processes and their consequences for the organisation and presentation of information". *Australian Journal of Psychology* 45 (1993): 1-8.
- Young JQ., *et al.* "Cognitive load theory: implications for medical education: AMEE Guide No. 86". *Medical Teacher* 36 (2014): 371.
- <https://lesley.edu/article/stages-of-memory#:~:text=When%20long-ter>
- <https://blog.udemy.com/improving-long-term-memory/>
- Pendleton D., *et al.* "The consultation: an approach to learning and teaching". Oxford: Oxford University Press (1984).

23. <https://twitter.com/Haypsych/status/1744691013061386303> (Figure)
24. Annette Burgess, *et al.* "Tips for teaching procedural skills". *BMC Medical Education* 20.2 (2020): 458.