Solenoid Valve DC 12 Volts Series and Disposable Contra Angle as Micromotor Replacement in Dental Lab Skill Laboratory

Hadiyat Miko¹, Syukra Alhamda², M. Faisal², Emma Kamelia¹
¹ Faculty of Dental Nursing, Politeknik Kesehatan Kemenkes Tasikmalaya, Indonesia
² Faculty of Dental Nursing, Politeknik Kesehatan Kemenkes Padang, Indonesia

Abstract
Micromotor drilling tool used as a tooth on the phantom, the problem usually found in lab skill laboratory on practice operative dentistry with the use of Micromotor frequent damage to the hand-piece (contra angle). Micromotor tends to heat up faster and has a low-speed, so it took a long time to complete the drilling (the preparation of), using the Micromotor tend to be less safe because of the power generated from the flow of electricity at any time could damage. The price of Micromotor also is quite expensive. The limitations of the budget funds for maintenance, repair, and procurement of Micromotor also became a problem. Based on these problems, the research team made a solution in the form of a replacement tool (substitute) Micromotor with the aim to resolve the existing problems as well as creating practices lab skill more effectively and efficiently. The use of a simple drill tool in the form of a series of Pneumatic Valve and Solenoid Disposable Hand-Piece Contra-angles as a new innovation in the laboratory of Dental Nursing Majors Preclinical Poltekkes Kemenkes in Tasikmalaya and Padang have been applied for a little over 3 years and have been able to more efficient cost of procurement tool of 70%. This disposable tool is apparently able to drill up to 20 times cavity preparation. This research uses a descriptive method. Data collection techniques are used to the question form or questionnaire. Population and sample the study is a student college 2nd years at the department of dental nursing Poltekkes Kemenkes in Tasikmalaya and Padang. From the results of research that the majority of students expressed pleased and satisfied. This product is expected to be applied as a solution.

Keywords: bur tools; skills lab; satisfaction; product

INRODUCTION
Education and teaching in lab skill is one of the implementation of the Tri Darma Perguruan Tinggi which is organized with the aim to prepare students in order to be ready to implement the public service in the future as well as a number of training conducted and expected to produce graduates who have a dental nurse workforce competency and competitive power, to achieve the goal required an adequate facility.

Tools and materials is a means of practice in the implementation of the laboratory, so that the state of the tools and medications need to get maximum attention. One effort that can be done to monitor the existence of tools and materials on a regular basis and continuous improvement. One of the main tools and most vital in the implementation of lab skill practices across all the Department of Dental Nursing in Indonesia is a micromotor.
Micromotor are used as tools of drilling gear on the phantom. Based on the experience and the reality in the field the problems that are commonly encountered in the lab skill laboratory on the practice of conservation by use of micromotor handpiece contra damage often occurs when the angel is being used, the micromotor tend to heat more quickly and have a low-speed, so it took a long time to complete the drilling, in case of damage of the micromotor then need a special technician to fix it, use of micromotor tend to be less safe because of the power generated from the flow of electricity at any time could crash if the security less cared for. The price is quite expensive for one micromotor reaches 5 million rupiah. The limitations of the allocation of funds for maintenance, repairs and new procurement tools micromotor becomes a problem found in the laboratory lab skill.

Based on these problems, the research team make a substitute with a goal of micromotor innovations can solve existing problems as well as creating practices lab skill more effectively and efficiently. The use of a simple drill tool as a tool of new innovations in department of Dental Nursing lab skill laboratory of Health Polytechnic of Tasikmalaya and Padang was applied for a little over 3 years and have been able to more efficient cost of procurement tool of 70%.

Appreciation of the students also felt the need to know how big the perceived benefits with the use of such innovations as well as the level of satisfaction of students can determine the quality of the goods or services [1].

A REVIEW OF THE LITERATURE

a. The satisfaction of student
The meaning of satisfaction is evaluative terms describing likes and dislikes [2]. Customer satisfaction is the satisfaction or dissatisfaction of customers and the difference between expectations and the perceived performance. The measurement of the level of satisfaction is closely associated with the quality of services rendered to its customers (students). One way to knowing the customer satisfaction measurement is perception customers about services received (satisfying or disappointing), including also the length of time of service. The perception is the mental processes that occur in human beings that will show how we date, heard, felt, fingered, and giving around us. The quality of educational institutions was strongly influenced by the input system for education such as students, lecturers and facilities advice supporting teaching and learning. All these factors are interdependent and affect each other in creating successful teaching and learning process.

b. Health education
Health workforce education is the process of education which is expected to produce specific skills/specific health education curriculum for it contains a maximum of 80% of the core curriculum and the curriculum of the institution of a minimum 20%. Health worker education program structure contains 40% content of theory and practice material 60%, so that laboratories play an important role in the achievement of competencies which presupposed in the curriculum.

c. Lab skill education activity
The types of activities that are done lab skill practices include student learning: Dental Assistant, Dental Nursing, communication in Microbiology, basic human needs, PPAKG, basic concepts of Teeth and mouth, Dental Material and PKG, cross-infection control, Oral Pathology, Preventive Dentistry, ethics and the responsibility of the profession and the main ones are the conservation of teeth.

d. Lab skill activity material
The materials are commonly used in lab skill include: stones, glass ionomer cement, cavit, cement base, zinc phospat, topical application of composite resins, gels, chlorine, etching, eugenol, etyl chlor, chkm, and others. The lab skill tools include: mold rubber casts beam, bowl, plaster casts, spatel, knife blade, a big malam knife and small, the phantom, phantom, cheek rubber caliper, handpiece, bur, spatel, mixing slab, plastic filling instrument, cement stopper, burnisher, matrix
retainer, solenoid strip, finishing strips and the main tool in the implementation of the practice of preclinical is a micromotor.

e. Problem in Lab skill with Micromotor
Problems found in the activities of the lab skill are:
1) The limitations of the tools to practice activities increased long time practice.
2) Dental conservation practice time on phantom that every student because of the micromotor has a low speed.
3) Easy destruction of micromotor tool when it is in use so that the practice of not running smoothly.
4) The complexity of repair tools micromotor because it consists of many part.
5) Many students who do not achieve the target of conservation practices because to do conservation practices ranging from 1 drilling up to finish takes about 1 hour for each operator while the limited amount i.e. micromotor tools there are only 10 tools.

f. Simple drilling tools
A simple drill tool consists of several parts including:
1) Compressor; the function of the compressor is to supply a large number of moderate-pressure air as a source of power on a pneumatic tool, such as drilling.
2) Solenoid valve; solenoid trigger power from air and electricity. The main function of a Solenoid is to set the direction of air pressure acting on the Solenoid. Solenoid is driven by 2 (two), namely electric air mover.
3) Air hose; air hose function as a channel to distribute the air flow pressure of the compressor fails parts that need. The diameter of the hose and material should be used in the installation of the tool should be selected simple drill appropriately. Most important things that should be considered in the selection of hose, among others, the volume of flow, length of the hose, the pressure of work, material hose as well as the layout and space available.
4) Handpiece disposable; handpiece working with a drill mounted on the end of it, namely to rid the network of dental caries. The power obtained from the handpiece is the air pressure generated by the compressor.
5) Foot control; the function of foot control is to control the rotation of the drilling tool. If foot control is pressed and will stop if a foot control detachable.

Fig. 1: The block diagram of the groove electromechanical tools

The workings of the tool drill phantom simple i.e. starting from the compressor, the compressor is switched on, after the air that is generated will be streamed to the Solenoid valve, Solenoid valve function is as a connecting air valve which is controlled with electric current either AC or DC, where the Solenoid valve is controlled using the foot control, the air pressure will produce energy at the rotary drill handpiece when located in the foot control on the press (stepped) and will stop when foot control is disconnected.

EXPERIMENTAL RESULT AND DISCUSSION
This research used descriptive research method because in its implementation include data, analysis and interpretation of the meaning and the data obtained. The method of data collection is used questionnaire and check-list. The population in this research is the students collage at 2nd
years in Department of Dental Nursing in Poltekkes Kemenkes Tasikmalaya and Padang. The sample in this research amount 12 students collage Tasikmalaya and 12 students collage Padang that have been used micromotor and simple drilling tools.

Table 1: Distribution frequency of Research sample base on sex

<table>
<thead>
<tr>
<th>No</th>
<th>Sex</th>
<th>n</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Male</td>
<td>8</td>
<td>33.4%</td>
</tr>
<tr>
<td>2</td>
<td>Female</td>
<td>16</td>
<td>66.6%</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>24</td>
<td>100%</td>
</tr>
</tbody>
</table>

Based on research conducted at the student’s collage 2nd years Dental Nursing, 24 people from the research sample are students who’s has been using dental micromotor craft made patching and simple drilling. Table 1 above can be seen that male samples as many as 8 people (33.4%), and women as many as 16 people (66.6%). Samples dominated by female students.

Fig. 2: Simple drilling phantom tools

Fig. 3: Disposable Handpiece

Fig. 4: Handpiece micromotor low speed

Based on table 2, we can be seen after the satisfaction of doing the patching frequency using the micromotor with criteria very satisfied there is no satisfied the criteria as much as 5 people (20.83%), less criteria satisfied as much as 19 people (79.17%), table 3 frequency of satisfaction can be seen doing the patching using simple drill tool with criteria very satisfied as much as 20 people (83.4%) the satisfied criteria as much as 4 people (16.6%), there are no less satisfied criteria.
Table 2: Distribution frequency of the satisfaction of having done patching *Micromotor*

<table>
<thead>
<tr>
<th>Score criteria</th>
<th>n</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>≥ 90</td>
<td>0</td>
<td>0 %</td>
</tr>
<tr>
<td>71 -89</td>
<td>5</td>
<td>20,83 %</td>
</tr>
<tr>
<td>&lt;70</td>
<td>19</td>
<td>79,17 %</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>24</td>
<td><strong>100 %</strong></td>
</tr>
</tbody>
</table>

The research was carried out at a time which coincided with treatment 1 day i.e. to know the comparison of satisfaction after using the tool simple and micromotor. Based on the results of the study showed the levels of distinction satisfaction and micromotor use simple drill tool. Table 2 shows the results of our satisfaction after use, i.e. the micromotor with criteria very satisfied the criteria as much as 5 people (20,83%), less criteria satisfied as much as 19 people (79,17%), table 3 it can be seen the frequency of satisfaction after conducting a drill tool uses simple patching with criteria very satisfied as much as 20 people (83,4%) the satisfied criteria as much as 4 people (16,6%), there are none less satisfied criteria.

Table 3: Distribution frequency of satisfaction after have done the patching using simple drill phantom

<table>
<thead>
<tr>
<th>Score criteria</th>
<th>n</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>≥ 90</td>
<td>20</td>
<td>83,3%</td>
</tr>
<tr>
<td>71 -89</td>
<td>4</td>
<td>16,7%</td>
</tr>
<tr>
<td>&lt;70</td>
<td>0</td>
<td>0 %</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>24</td>
<td><strong>100 %</strong></td>
</tr>
</tbody>
</table>

The results can be noted that the use of a simple drill level phantom our satisfaction higher than the micromotor. Factors that cause the difference our satisfaction rate is due to a simple drill tools more effectively in the activities of lab skill committed the student, with the simple conservation practices bur teeth faster and more convenient to use. It can be inferred from both the student drill lab skill tool more satisfied using simple drill phantom.

**CONCLUSION**

Based on the results of the study, overview of satisfaction of tools simple drill in Lab skill is better than students are usage micromotor. The advantages of simple drilling tools compare with micromotor, e.g:

1. Cost; the cost for 1 micromotor same with cost for making of the 8 simple drilling tools (1:8), if for 1 purchase micromotor requires funds amount 5 million but with the same fee can be made 8 simple tools. In case of damage, the costs of that treatment is cheaper, low speed handpiece micromotor price new is IDR. 1,500,000,00 while cheaper disposable handpiece i.e. IDR 75,000,00.

2. Time; if we have seen in terms of the timing of the completion of the drilling, having tested the tool simple drilling faster because you are already use high speed compared to micromotor which still use low speed, if it is to complete the drilling gear case 1 micromotor can finish it within 20 minutes then with simple drilling can be solved by the time 2 minutes.

3. Easy to use; if we have seen from the easy to use, the use of the micromotor operated requires special skills whereas with simple operated drilling easier.

4. Maintenance; if we have seen in terms of treatment, in case of damage of the micromotor it is necessary a special technician to fix it while a simple repairable own fast and easy.

5. Security; if we have seen in terms of the safety to use of the micromotor, felt less secure because the power generated comes from the flow of electricity while the tool simple power generated bur comes from the flow of the wind that is sourced from the compressor.

6. Efficient; viewed from the use of power tools, more efficient electricity simple drilling, if 5 micromotor is used then requires 5 power supply then with 5 simple drilling tools requiring only 1 power to turn on the compressor and in the compressor-generated wind power can be channeled into 5 simple tools of the drilling tool.
REFERENCES


