

MAKING A SIMPLE TAM-EM BOARD TO ASSIST RADIOLOGICAL EXAMINATION IN BABIES USING ACRYLIC

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ABSTRACT

Repetition on radiographic films due to object movement that often occurs in uncooperative patients, especially occurs in infants or toddlers, examinations that are often performed on infants or toddlers are examinations of the thorax and abdomen. A simple board to help radiological examinations in infants using Acrylic. To find out the effectiveness of making Tam Em Board Aids on baby examination using acrylic. This type of research is qualitative with experimental methods. Testing the Tam Em-Board tool at Pariaman Hospital by involving a radiographer as an assessor in testing a device with infant patients by assessing several components including the reliability of the tool when used, the safety of a tool during the inspection process, the quality of the radiograph produced when using the tool, the aesthetics of a device. tools and whether there are repeated examinations when using the Tam Em-Board tool, after testing with several assessment components and an assessment questionnaire of a tool assessed by the accompanying radiographer, it can be concluded that the tool works well and there are no repetitions during the examination.

Keyword : Acrylic, Fixation Device, Baby, Tam Em Board.

BACKGROUND

Science and technology is developing very rapidly and increasingly sophisticated. According to Rasad (2016:1) Wilhelm Conrad Rontgen, a physicist at the University of Wurzburg, Germany, first discovered X-rays in 1895, while conducting experiments with cathode rays. At that time he saw the emergence of fluorescence rays originating from barium platinocyanide crystals in a Crookes-Hittorf tube which was electrified. achieved by conventional inspection methods. To achieve optimal health services by a hospital, according to Papp (2006:17), the role of the radiographer is needed in improving imaging efficiency by maximizing the use of existing tools and resources. Many factors affect the quality of radiographs, including equipment factors such as X-ray machines, cassettes, film washing as well as engineering factors for human resources and patients. According to Suganda Tanuwidja (2002), a baby has a period of growth or infancy which is divided into two parts, the first being early infancy 1-12 months, this period the baby shows rapid growth and the maturation process continues continuously. especially the increasing function of the nervous system, the second baby enters late infancy 1-2 years, at this time the growth rate begins to decrease and there is progress in motor development and excretory function.

Repetition on radiographic films due to object movement that often occurs in uncooperative patients, especially occurs in infants or toddlers, examinations that are often performed on infants or toddlers are examinations of the thorax and abdomen. At the time the examination was carried out, then the patient was uncooperative, it would produce an unclear picture caused by the patient's movement, so that the picture was not suitable for reading and resulted in the repetition of the resulting radiographic film. According to Rahman (2009: 185) a radiograph is required to be able to provide clear information in an effort to establish a diagnosis. When the resulting radiograph has all the information needed to confirm a diagnosis, it has a high image quality. To meet a high quality radiographic image, the radiograph must meet several aspects that will be assessed in a radiograph, namely: Density, Contrast, Sharpness and Detail. All of these aspects must be of good value so that the radiograph is said to have good image quality. According to Rahman (2009: 185) a radiograph is required to provide clear information in an effort to establish a diagnosis. When the resulting radiograph has all the information needed to confirm a diagnosis, the radiograph has a high image quality. details. All of these aspects must be of good value so that the radiograph can be said to have good image quality.

Repetition on radiographic films due to object movement that often occurs in uncooperative patients, especially in the examination of infants or toddlers, when the examination is carried out then the patient is uncooperative, it will produce an unclear picture caused by patient movement, so the picture is not worth reading and resulting in repetition of the resulting radiographic film, it takes a long time in the examination process, apart from the movement of the baby we must also pay attention to the principles of radiation protection received by the patient's family such as justification, limitation, and application of optimization and radiation safety received by the patient's family. According to Perka Bapeten No. 8 of 2011, radiation protection requirements include 3 principles of radiation protection, namely justification or justification which in Article 24 paragraph (1) of which the use of x-ray equipment must be based on the consideration that the benefits obtained are far greater than on the risk of harm that is caused, while the limitation is that the dose received by a person in carrying out a diagnostic radiology service must not exceed the NBD (dose limit value) set by the authorized agency and optimizing exposure and radiation safety, is an effort so that radiation workers, the community, and the patient's family who are in the vicinity of the radiology installation receive the lowest possible radiation exposure that can be achieved. Based on observations, the authors found several problems when examining infants, including the baby moving during the examination process so that the results of the picture were not good, in addition to the movement factor of the baby, the author also found that during examination the baby was often held or assisted by the patient's family or the mother of the baby. So that the family or mother of the baby is exposed to scattered radiation, so that the principle of radiation protection does not work properly.

METHOD

TYPE OF RESEARCH

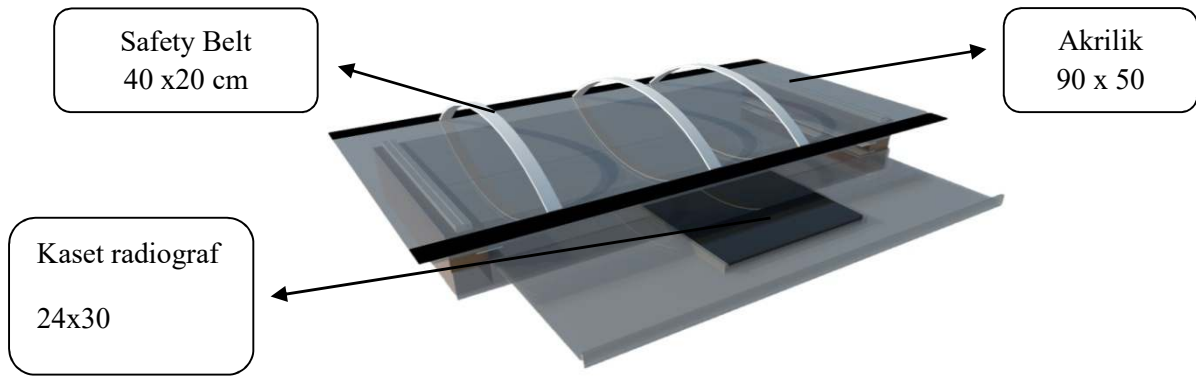
The scope of this research is design, manufacture and assessment. Make a design for the construction of examination aids (radiographic fixation), manufacture of examination aids (radiographic fixation) by adjusting the condition of the patient and the object being examined, and review the results of the design of examination aids (radiographic fixation). Thus this research is experimental. This research is a qualitative research, with the aim of being a basic research, using experimental methods. The time of data collection was from August to September 2021 at the Derah Pariaman General Hospital.

SUBJECTS OF RESEARCH

Subjects of research is infant patients aged 0-1 years.

Design Of Research

Research on making a simple Tam-Emboard tool to assist radiological examinations in infants using Acrylic. The material used in this study is a safety belt. One of the important parts of this tool is a seat belt that is attached to the left and right sides of the tool and also attached to the head. This tool serves to ensure the object, especially in the examination of babies, which have a lot of repetition due to the movement of the object. Plastic foam with a size of 82 x 40cm, is placed on the top of the radiographic examination tool, it is hoped that with this plastic foam the X-rays that are transmitted to the radiographic film are maximized, and make the object to be examined in the middle of the cassette. Acrylic Measuring 90 x 50 cm for the baby's view, and 40 x 35 for the location of the cassette serves as the main material in the manufacture of a simple Tam-Emboard tool to assist radiological examinations in infants using Acrylic. Wooden beam measuring 36 x 11 cm serves as a support or retainer from acrylic. The manufacture of the tam em board tool uses several components or main materials consisting of various sizes of acrylic including, 90 x 50 cm acrylic to replace the examination table, 40 x 35 cm acrylic for the cassette holder, besides the Tam-Em Board tool uses blocks. wood measuring 36 x 11 cm apart from that the Tam-Em board tool uses a safety belt measuring 40 x 20 cm which functions as a binder so that during the inspection there is no movement of the baby, in addition the Tam-Em board tool is also equipped with a foam baby bed measuring 36 x 11 cm. 70 x 40 cm which serves for the baby's comfort during the examination process. The design drawing of the Ta em Board tool:



STAGES OF RESEARCH

This examination aid (radiographic fixation) is designed to assist in radiographic examination of infant patients, with a variety of equipment that has been designed, in an effort to minimize the occurrence of movements that cause repetition. This tool has advantages in terms of cost, which is relatively cheap and easy, but also has a disadvantage, namely that this radiographic fixation examination tool can only be used in infant patients aged 0-1 years.



Figure 2. The result of the Tam-Em Board Toolkit, seen from the front



Figure 3. The results of the Tam-Em Board Toolkit design seen from the side.

RESULT AND DISCUSSION

After conducting trials on 9 respondents at Pariaman Hospital, the following results were obtained:

1. Functional test results on radiographs

the results of the radiographic function test play an important role in supporting the diagnostic process in infants to be more precise and optimal. The results of the tool function test assessed by the radiographer are as follows:

Table 1. The results of the radiographic function test of the tool that has been designed

Respondent rating	Number of respondent	percentage
Baik	7	77 %
Sedang	2	22 %
Kurang	0	0

Description :

1. Good : Chest X-ray looks sharp overall and there is no blur
2. Moderate: Chest X-ray looks a bit blurry
3. Less: the chest photo is not sharp

One example of a radiograph that has used the design of a tool made of acrylic is as follows:



Figure 4. Baby Radiograph

2. Function test results on photo repetition

The results of the function test on whether or not there are photo repetitions that play an important role in minimizing radiation to both patients and staff. The test results obtained are as follows:

Table 2 test results of photo repetition function

Statement	Number of respondent rating	percentage
Repeat	1	11 %
Not repeat	8	88 %

Description :

1. Repeat: there is a repetition of the radiographic examination of the baby
2. Not repeated: there is no repetition of baby radiographs

This examination aid (radiographic fixation) is designed to assist in radiographic examination of infant patients, with a variety of equipment that has been designed, in an effort to minimize the occurrence of movements that cause photo repetition (Whitley, 2005).

The results of the design of fixation aids consist of several parts, namely:

1. Acrylic

The material for Tam Em Board is Acrylic. Acrylic elastomer is a special rubber with an excellent set of properties such as resistance to high temperatures (>150 °C), UV, ozone, oxygen, sulfur-containing oils and greases, and dimensional stability in aliphatic hydrocarbons. Most of the general purpose elastomers such as natural rubber, SBR, etc., do not have this property. Therefore, all these properties have made acrylic very useful in automotive industrial applications and the manufacture of oil cooler hoses, transmission seals, rear axle seals, etc. Acrylic elastomeric monomers have a carbon-carbon backbone with pendant carboxy groups and -hydrogens connected to alternative carbon atoms in the polymer chain.

2. Plastic foam

Plastic foam with a size of 82 x 40 cm, is placed on the top of the radiographic examination tool, it is hoped that with this plastic foam the X-rays transmitted to the radiographic film are maximized, and make the object to be examined in the middle of the cassette.

3. Safety belt

One of the important parts of this tool is the seat belt which is attached to the left and right sides of the tool and also attached to the head. This tool serves to ensure the object, especially in the examination of infants, which is a lot of repetition due to the movement of the object.

4. Wood beam

Wooden beam measuring 36 x 11 cm serves as a support or retainer from acrylic.

To assess the effectiveness of the tool used is to perform a radiographic function test and photo repetition. The results of the radiographic tests that have been carried out show that 77% of respondents gave a good assessment of the radiographs of the examination results. A good assessment shows that the results of the photo can be optimal for making a doctor's diagnosis.

The results of the test on the repetition of the design photos of the tools used showed that 88% of respondents responded quite well. The resulting radiograph shows the minimization of photo repetitions so that the radiation dose received by patients, staff and their families can be reduced. (Mc Clean, 2014).

In using the Tam-Em Board tool, there are several procedures that must be considered, namely, at this stage all the equipment and materials used are prepared, and put the mat on the cassette mat and position the baby on the Tam Emboard tool and make sure the baby's position is comfortable on the floor. on the tam em board tool, after the baby is positioned, attach the safety belt or seat belt right on the baby's legs and chest, make sure the safety belt is installed correctly. Make sure the baby is comfortable and has minimal movement during the examination process. The next step, after the inspection is complete remove the safety belt. The design results of the tools that have been made have the advantage of being safe to use and very flexible so they can be used in various places.

CONCLUSIONS AND SUGGESTIONS

Tam em board inspection tools are safe to use because they are made of acrylic material and are flexible to use in various places. The function of the tool can be adjusted according to the needs of the examination, there are several functions of the safety belt so that it helps reduce the movement of the baby and makes the examination easier, and is able to shorten the examination time. By using radiographic aids, it is able to reduce the occurrence of repetition due to patient movement while getting optimal results.

With the Tam-Emboard tool, the authors hope in the future to add various functions so that the examination carried out is not only AP projection but also lateral examination.

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