

CASE REPORT
SIMPLE COST EFFECTIVE USE OF TENNIS BALL AS TEACHING AID
TO ACQUIRE CLINICAL SKILLS OF EXAMINATION OF THYROID
MASSES TO MEET LOCAL NEEDS IN NIGER DELTA UNIVERSITY,
BAYELSA STATE.
A REPORT AND LITERATURE REVIEW

¹Professor Beleudanyo Gbalipre FENTE BMBCH, FWACS, FMCS, FICS, CGNNF

¹Dr. Koroye Oyintonbra Funkuro MBBS, FWACS, FACS,

²Dr. Bomonyo Gbalipre FENTE MD

¹Department of Surgery Niger Delta University, Bayelsa State

²Gbalipre Specialist Clinic & Maternity,
Yenagoa, Bayelsa State

Address of Correspondence
Professor Beleudanyo Gbalipre FENTE
Department of Surgery Niger Delta University,
COLLEGE OF HEALTH SCIENCES, BAYELSA STATE
Email: bgfentekoko@hotmail.com

ABSTRACT:

Introduction: The use of simulation and simulators in medicine to train and educate healthcare professionals has gained attention in recent years. Simulation and simulators now make training and education much more efficient in the healthcare system. The aim of this paper is to present a simple cost effective use of a table-tennis ball as a mass to acquire clinical skills in the examination of thyroid masses.

Method: We present a simple cost effective use of tennis ball as a mass to acquire clinical skills in the examination of thyroid masses. It is constructed utilizing tennis ball, crepe bandage and adhesive tape.

Result: A simple, cheap, easy to construct and effective stimulator device as a teaching and learning aid to acquire clinical skills in examination of the thyroid gland. It has been used in our centre effectively in addition to other stimulators in the clinical skills laboratory.

Conclusion: The affordability and ease of construction of this simple device of a Tennis Ball as a mass and its effectiveness as a teaching-learning aid to acquire clinical skills in the examination of thyroid masses meets our environmental local needs. The device is recommended in developing countries/medical schools that are yet to have purpose built simulation centers which contain sophisticated manikins and other high fidelity simulators.

KEYWORDS; *surgical simulation, thyroid examination, neck examination, low fidelity model, cheap simulation*

INTRODUCTION:

Medical education and training is an apprenticeship and requires frequent practice. In times past, this practice was done on live patients. This practice or learning on patients is different from a doctor performing a focused examination on a patient or methodically performing a surgical procedure with mathematical accuracy. The “need” for trainee competence before “touching” a patient led to the birth of simulation in surgery. The quote “there is no longer the need to practice on patients” was credited to William Mayo, the founder of the Mayo Clinic as far back as 1923.

The use of simulation and simulators in medicine to train and educate healthcare Professionals has gained attention in recent years and many simulation centers have now been set up in the UK. Simulation can also be a practical solution to several current educational issues. These include the challenges faced by educational institutions in securing clinical placements, the decrease (keep) in the social acceptance of trainees learning on patients. Training using simulation for healthcare professionals takes place in many settings. They include:

- purpose built simulation centers which contain sophisticated manikins
- clinical skills laboratories, which contain surgical skills trainers
- hospital wards and clinical areas such as intensive therapy units (ITUs), which will
- have portable manikins
- specialist teaching rooms, for virtual reality training
- specialist teaching rooms containing manikins.

Simulation is classified low or high fidelity based on degree of realism i.e. resemblance to live patients, tasks and scenarios.² They can also be organic and inorganic. Organic

simulation like use of cadavers and live animals tend to be of high fidelity but there are some ethical issues as well as the risk of infection transmission.

Simulation and simulators are now a vital part of our healthcare system. They make training and education much more efficient and most of the sophisticated high fidelity manikins are manufactured and designed in the US or in mainland Europe and Asia. The majority of surgical simulators have improved patient care and safety. There is a Clinical Skills Laboratory in our Centre with devices range from the simple plastic devices that teach medical students how to stitch wounds and other clinical skills. Due to cost to acquire complex high fidelity sophisticated devices that combine mechanical models with computer stations used to teach basic skills, we devised this simple use of a table-tennis (ping-pong) ball as teaching aid to acquire clinical skills in examination of thyroid masses to meet our local needs.

LITERATURE REVIEW:

The word “Simulation” bears some interesting definitions in the literature. Gorman et al defined good simulation to mean “representing simplified reality free from the need to include every possible detail.” Allery et al define it as “a structured activity designed to reflect reality, real life and real situations”. Simulation serves three purposes, paedagogical, ethical and practical.

Innovation is difficult to define and there are several definitions of innovation in the literature. A further definition was offered by Carpenter. Carpenter explored definitions of the term 'innovation' and found that they fell within five themes. These were creativity, unmet user needs, problem solving, business models and applied invention. His work led him to the following definition of innovation:

'A change in a product offering, service, business model or operations which meaningfully improves the experience of a large number of stakeholders'⁵. Simulation in teaching is an innovation.

Innovative teaching involves using innovative methods and teaching learning materials for the benefit of students. According to Anderson and Neri in 2012, innovative teaching can involve virtual labs: learning activities based on real-life problems; learning environments with equipment, furnishings, materials, and audiovisual resources; and learning guides for students and the teacher. All of these are combined with methodologies that promote the use of active teaching techniques that help teachers develop their students' learning abilities.⁷ Due to new challenges such as the decrease in the social acceptance of trainees learning on patients, new teaching methods had to be devised. To respond to such diverse needs of the students at higher educational levels, different innovative teaching and differentiated strategies and methods are being used by the teachers in their classes. Since the last three decades, innovative teaching methods to deal with the diversity of today's students are widely being used worldwide. Establishing lifelong learning in the healthcare workforce is as important as raising the standards and quality of care. With the current situation where university classrooms are overcrowded and comprise a blend of individuals with different socioeconomic backgrounds and having different levels of intellect and mental abilities, Guri-Rosenblit, Šebková, & Teichler, stated that a teacher should have a flexible and creative mind, should be innovative in their teaching methods and should adopt different strategies to facilitate every single individual of their classroom according to the capabilities and differences of students.⁹

The aim of this paper is to present our simple cost effective use of Tennis Ball as an innovative teaching aid that is very useful considering our peculiar circumstances in this part of the world.

METHODOLOGY: SIMPLE COST EFFECTIVE USING OF TENNIS BALL AS TEACHING AID

We present a simple cost effective use of Tennis Ball as a mass to acquire clinical skills in the examination of Thyroid masses. It is constructed using a table-tennis (ping-pong) ball, crepe bandage and adhesive tape. Pictures below are the materials required and the final construction with Final Year Medical Students (Group 9) using it to demonstrate clinical examination of the thyroid gland during Professor FENTE'S special Clinical Skills Acquisition Sessions held every Sunday at the Niger Delta University Teaching Hospital, Okolobiri. With this model the students are taught the tenets of examination of a lump/ mass i.e. the site, size, shape, tenderness, differential warmth, consistency and edges. They are also taught other areas to be examined including the lymph nodes, scalp, the eyes, palms, the shins and the deep tendon reflexes



Pic 1; the required materials, a table Tennis ball, a 6 inch Crepe bandage and adhesive tape



Pics 2 and 3 showing the making and the finished product.



Pics 4 shows the model strapped to a simulated patient and



Pic 5 shows a medical student examining the simulated patient



Pics 5 and 6 show a final year medical student examining a simulated patient with our model during the Final MBBS Surgery Short Case Examinations.

DISCUSSION;

Teaching-learning aids are used at various levels of medical education worldwide since time immemorial for better communication. With the technological revolution more and more innovative aids like E-learning, Online Learning, Web-based Learning, or Distance Learning are being introduced by various institutes. These are extensively used as many

are freely available for wider knowledge dissemination. Even recorded lectures are uploaded in freely available public domain; webinar and live lecture demonstration are also available through v-sat virtual learning, virtual workshop, virtual classrooms and virtual conferences. These are not readily available in our environment. Flexibility and cost-effectiveness are vital in selection of medical educational technology and continuing professional development programs.

In imparting diverse clinical skills, simulators replicate the case scenario that is not viable to directly perform subsequent procedures on patients. Such recreated medical realities in virtual space provide an ethically sound platform for learning varying from psychomotor to cognitive, affective, endoscopic and emergency skills. Due to the new challenges of the decrease in the social acceptance of trainees learning on patients in our environment, this device and other subjects standing for masses for acquiring clinical examinations skills becomes handy and effective. Literature also reported comparable learning experience among undergraduate medical students when they were exposed

to multiple teaching-learning aids in different permutations and combinations. The role of medical teacher is not only to impart knowledge but also for holistic care in capacity building to improve the health care scenario in any country. Students build up concepts and perceive facts through teaching-learning sessions and knowledge repositories like books and other virtual platforms. As stated by Guri-Rosenblit, Šebková, & Teichler⁹, a teacher, should have a flexible and creative mind, should be innovative in their teaching methods and should adopt different strategies to facilitate every single individual of their classroom according to the capabilities and differences of students; this is a clear

demonstration to use locally available material as effective teaching-learning aid.

Palpation is an integral skill in the evaluation process. With creative instruction, educators can help students advance their skills. Head and neck task trainers with haptic feedback that measure palpation pressures have been developed. There are also commercially available “anatomy lab thyroid gland examination simulators” but these are quite expensive. Surgical simulation is an emerging field in Nigeria and there is a paucity of support staff like simulation technologists, clinical skills lab technicians, biomedical engineers and roboticists.

Our product is an inorganic, low fidelity simulation model and like all low fidelity simulation models, realism and high technology is traded off for low cost, portability, unlimited repetitive use and feedback as well as unsupervised use. They are also associated with mastery and overlearning, both good qualities according to Massoth et al. Studies have also shown that there is no significant benefit of high fidelity compared to low fidelity simulation models¹² and indeed some world renowned hospitals like the Mayo Clinic are proponents of low fidelity simulation.¹ Also scholars in a nursing school in San Francisco reported the use of a citrus fruit as simulation for vaginal examination. This low cost task training model enabled students examine for cervical dilatation and effacement. This became necessary as they were having very little experience with actual patients.¹³

While our model may not move up and down with deglutition or tongue protrusion, it is adapted to our environment and is serving an important need. Like the popular saying goes “the end justifies the means”. With either washing and sterilization or changing of the crepe-bandage, the fear of infection transmission is minimal. The lead author has been involved in the development of an earlier

medical device, "Simple lithotomy device for children" that has been widely read and cited in various publications worldwide.

CONCLUSION:

Extensive evidence of innovative practices in teaching and learning for students in healthcare higher education using stimulators, technological and non technological teaching and learning aids approaches have been reported. This simple use of a Tennis Ball as a mass to acquire clinical skills in the examination of thyroid masses is an effective teaching-learning aid that meets our environmental local needs, is cost effective and easily constructible. Other objects of various sizes can also be strapped at various parts of the body as teaching-learning aids.

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