

MELAKA
INTERNATIONAL
INTELLECTUAL EXPOSITION

MIIEX'24

12 JUNE '24

Dewan Taming Sari,
Universiti Teknologi MARA Caw. Melaka,
Kampus Alor Gajah, Melaka

*"Empowerment of Special
Needs through Invention
& Innovation"*

**EXTENDED
ABSTRACT**

MiiEX'2024

MELAKA INTERNATIONAL INTELLECTUAL EXPOSITION 2024

**“EMPOWERMENT OF SPECIAL NEEDS THROUGH INVENTION AND
INNOVATION”**

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UiTM Cawangan Melaka

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78000 Alor Gajah

Melaka Bandaraya Bersejarah

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MiiEX'2024

MELAKA INTERNATIONAL INTELLECTUAL EXPOSITION 2024

“EMPOWERMENT OF SPECIAL NEEDS THROUGH INVENTION AND
INNOVATION”

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INNOVATION, INVENTION, AND DESIGN

FOREWORD BY THE RECTOR OF UiTM CAWANGAN MELAKA



Professor Ts. Dr. Mohd Rasdi bin Zaidi

Rector, Universiti Teknologi MARA (UiTM)

Cawangan Melaka

Welcome to the Melaka International Intellectual Exposition 2024 (MIIEX '24). It is an honour for me, on behalf of UiTM Cawangan Melaka, to thank all of you for joining MIIEX '24. We are proud to inform you that this is the 13th consecutive year that UiTM Cawangan Melaka is organizing this exposition. Since 2009, UiTM Cawangan Melaka has successfully hosted this innovation exposition. Not only have we succeeded in organizing the exposition, but we have also successfully embarked on commercialized products.

2024 is a special year where MIIEX 2024 emphasizes the development of special needs. As we know, special needs indicate a limitation in a person's ability to engage in and benefit from various aspects, such as daily activities and education. Hence, with the theme "Empowering Special Needs Through Invention and Innovation," it is a platform for industries, professionals, academicians, students, and communities to share their innovative ideas and products to increase accessibility for those with special needs.

The successful implementation of MIIEX '24 is our joint success. This event was supported by the Melaka state government through YB Datuk Fairul Nizam bin Roslan, the EXCO of Science, Technology, Innovation, and Digital Communication. I also want to express my

gratitude to Universitas Negeri Padang, Indonesia, Universitas Muhammadiyah, Makassar, Indonesia, the International Association of Economic and Businesses (IAEB), Universiti Sains Islam Malaysia, Ibnu Umami Maktum Research Center (UMMI), USIM, and The Southeast Asia Minister of Education Organization Regional Centre for Special Educational Needs (SEAMEO SEN) as our co-collaborators for MIIEX 2024.

The collaboration from various parties in MIIEX '24 is a platform that will improve cooperation and interweaving among industries, professionals, academicians, students, and communities in shaping their potential in developing innovation products. This exposition also serves as a platform to cultivate and uphold the nation's innovation culture by presenting new ideas and research by young people, especially from academia and universities. Indirectly, MIIEX '24 will encourage all inventors towards empowering Science, Technology, Engineering, and Mathematics (STEM), especially in primary and secondary schools.

The new digital landscape also inspires more innovation and new ideas that contribute to various activities, such as business and industries. As a university that encourages "Research and Innovation," we aim to foster more innovative products that benefit scholars, industries, and communities, addressing issues to improve our present and future life.

This exposition would never happen without dedication, teamwork, and commitment. A round of applause should be given to the committee teams, who are the backbone of this exposition. Their hard work, effort, and time made this exposition possible.

Finally, I would like to conclude this brief remark by thanking all the participants and stakeholders for joining the exposition. We hope that this collaboration never ends here.

Thank you.

FOREWORD BY THE DEPUTY RECTOR (RESEARCH & INDUSTRIAL LINKAGES)



Associate Professor. Dr. Nur Hayati binti Abd Rahman

Deputy Rector (Research & Industrial Linkages), Universiti Teknologi MARA (UiTM) Cawangan Melaka

With much passion and privilege, let me warmly welcome all of you to the Melaka International Innovation Exhibition (MIIEX), UiTM Cawangan Melaka's flagship event. I firmly believe that events such as these demonstrate the gradual evolution of this platform in terms of its significance and its governing principles within the sphere of learning and the broader scholarly society.

The theme for this year, "Empowering Special Needs Through Invention and Innovation," strongly connects to our mission of using research and technology to make a positive impact on the world we live in. Besides enforcing the message of diversity, this theme also reaffirms our focus on creating products to improve the lives of people with disabilities (PWDs). Such innovations are vital as only through focused constructive changes can society become more sensitive to the needs of all members.

MIIEX allows researchers, students, and industry professionals to come together, share their innovative research, and develop viable research partnerships. It has been great to see the enthusiasm of the participants and the efforts they put into their projects, which can offer various social and economic benefits. This is why one can state that MIIEX is a great

opportunity for creating connections between the academic environment and industry, facilitating the implementation of innovative and promising projects.

Finally, I would like to express my sincere appreciation to all the members and supporters of the organizing committee, all the participants, sponsors, and everyone involved in preparing this event. I want to express my gratitude for your commitment and involvement, as the success of MIIEX and the development of an active culture of innovation in our university and beyond is partly owed to your support.

Thank you

FOREWORD BY THE PROJECT DIRECTOR



Dr Zulkefli bin Muhamad Hanapiyah

Senior Lecturer

Assalamualaikum and Warmest Greetings,

It gives me a great pleasure, on behalf of the organizing committee, to welcome all participants and speakers to the Melaka International Intellectual Exposition 2024 (MIIEX '24) with the theme "Empowering Special Needs Through Invention and Innovation." We are honoured and pleased to welcome all participants to this biennial event.

MIIEX '24 is a platform that gathers experts from local and international industries, academia, scientists, researchers, and the community to contribute to the advancement of scientific and technological knowledge. This knowledge helps develop disruptive innovation products that improve daily activities for businesses and the community, especially those with special needs.

MIIEX '24 provides an atmosphere for inventors of all levels to gain new exposure and collaborate. Indirectly, this promotes a collaborative and innovative culture that focuses on cutting-edge technologies and new standards in technology and creativity.

MIIEX '24 is anticipated to serve as an arena for participants to acquire and disseminate revolutionary information on ideas and innovation. It is intended that the competition will expose the contestants' minds to the latest technologies and designs, aligning with the government's goal of encouraging innovation in Malaysia.

Finally, I want to compliment my fellow committee members on their amazing efforts, which were vital to the event's success. In addition, I want to thank our co-organizers, event sponsors, and participants. Optimistically, we hope that all new knowledge discovered, invented, or innovated will lead us toward future sustainability.

Thank you.

**FOREWORD BY MELAKA STATE EXCO OF SCIENCE, TECHNOLOGY,
INNOVATION AND DIGITAL COMMUNICATIONS**



YB Datuk Fairul Nizam bin Roslan

Melaka State Exco of Science, Technology, Innovation and Digital Communications

Welcome to the Melaka International Intellectual Exposition 2024 (MIIEX '24). It is an honor for me, on behalf of UiTM Cawangan Melaka, to thank all of you for joining MIIEX '24. We are proud to inform you that this is the 13th consecutive year that UiTM Cawangan Melaka is organizing this exposition. Since 2009, UiTM Cawangan Melaka has successfully hosted this innovation exposition. Not only have we succeeded in organizing the exposition, but we have also successfully embarked on commercialized products.

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Thank you.

MIIEX'24 ORGANISING COMMITTEE

COMMITTEE	NAME
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	DR NORASHIKIN ADAM
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	AFZAN SAHILLA BINTI MOHD AMIR HAMZAH
	MUHAMMAD FURQAN BIN AZHAR
	KHAIRUL AZHAR BIN LOCHMAN

ABOUT MIIEX'24

MIIEX'24 is an innovation competition annually organised by UiTM Melaka with the intention to bring together ideas and inspiration that could fit in for commercialization needs.

This event creates a platform for researchers to establish networking, partnership and opportunities to collaborate with industries.

OBJECTIVES

1. Encourage and instil passion towards inventing and innovating among UiTM Cawangan Melaka staff, students and academicians of local and international higher education institutions;
2. Highlight distinguished talents of skilful inventors and exhibit intellectual products, inventions and innovations among local and private tertiary institutions, government and private agencies, including international participants;
3. Become an effective Business Matching platform for participating research products, matching industries and partnering government agencies;
4. Recognise, inspire and promote invention and innovation products to be patented and commercialized;
5. Increase passion towards inventing and innovating through research and boost interests of government and non-government agencies to obtain consultancy services from a line up experts of higher education institutions and UiTM Cawangan Melaka.

THEME

'EMPOWERMENT OF SPECIAL NEEDS THROUGH INVENTION AND INNOVATION'

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iHEADEase: Innovative Head Immobilisation Device for Special Care Patients During Dental Procedures

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Abstract

Protective stabilisation using mechanical restraint is a dental behavior technique designed to optimise patient comfort and safety during dental procedures. By facilitating proper patient positioning, it contributes to a more positive experience while minimising potential risks for both patients and the dental team. Dental professionals often encounter challenges when performing dental examinations and treatments on special care patients due to involuntary or voluntary head movements for example in patient with cerebral palsy. Traditional mechanical restraints are typically rigid, lack flexibility, and are difficult to adjust. These limitations are particularly pronounced when managing uncooperative patients or individuals receiving dental care at home, where flexibility and portability are essential. The objective of this project is to develop a portable head immobilization device for special care patients undergoing dental treatment. The iHeadEase device features distinctive elements, including a customizable sponge that conforms to the patient's facial contours, a Velcro strap that can be adjusted to fit every user, and built-in portable speakers for distraction purposes. A neck pillow provides support and limits head movement, promoting enhanced comfort throughout the procedure. iHeadEase ensures a well-distributed force on the patient's head, thereby enhancing overall procedural safety, comfort, and efficiency for both the patient and the dental team. Due to its universal design, it is suitable to be used by dentists and caregivers worldwide.

Keywords: dentists, dental care, patient positioning, head movements, protective stabilisation.

1. INTRODUCTION

Special needs patients exhibit a higher tendency for noncompliance during dentistry, often stemming from factors such as fear, anxiety, past unpleasant experiences, inadequate mental preparation, cognitive impairment, developmental delays, inadequate coping skills, negative emotions, maladaptive behaviors, and physical or mental disabilities, as well as acute or chronic illnesses (American Academy of Pediatric Dentistry, 2023). Behavior guidance techniques, encompassing nonpharmacological and pharmacological approaches, alleviate anxiety, foster a positive attitude toward dental care, and deliver high-quality oral health services safely and effectively for individuals with special needs (Dhar et al., 2023). Protective stabilization through mechanical restraint is a dental behavior technique to optimize patient comfort and safety during dental procedures by facilitating proper patient positioning, thereby fostering a more positive experience while minimizing potential risks for both patients and the dental team. This method effectively restricts movement. It is essential when managing patients who may exhibit involuntary or voluntary head movements, such as intellectual impairment, cerebral palsy, and tardive dyskinesia of Parkinson's patients (Ettinger, 2000).

2. OBJECTIVE

The head, a mobilized part of the body attached to the neck, poses a significant challenge to stabilize during dental procedures. Traditional mechanical restraints are typically rigid, lack flexibility, and are difficult to adjust. Olympic Papoose Boards™, available in the market, had head immobilizers, which are costly and restrictive (Natus Medical Incorporated, 2012). These limitations are particularly pronounced when managing uncooperative patients or individuals receiving dental domiciliary care, where flexibility and portability are essential (Southern Association of Institutional Dentists, 2017). Therefore, the aim of this project is to develop a portable head immobilization device to facilitate safe and efficient dental treatments.

3. NOVELTY & INVENTIVENESS

We designed this device to provide effective physical control, enabling dental teams to perform procedures with precision, prioritize patient comfort, and maintain optimal visibility for the

operator. iHeadEase boasts distinctive features, such as built-in portable speakers for distraction and a customizable sponge to conform to the patient's facial contours. Furthermore, a neck pillow supports and limits head movement, promoting enhanced comfort throughout the procedure. Its Velcro strap allows effortless attachment to an arm, making it universally usable by different operators. An assistant or caretaker will hold iHeadEase, allowing patients to focus their sight on the holder and receive tender, loving care during dental treatments, especially when their loved one is holding it. Human holding also allows independence for activation, as the head is the last part of the body to be restricted to avoid restricting blood flow and respiration while allowing monitoring of the patient's condition(American Academy of Pediatric Dentistry, 2015).

4. PRACTICALITY & USEFULNESS

iHeadEase is a dental device that restricts head movement during dental procedures, improving patient comfort and safety. Its simple design and user-friendly features, such as a Velcro strap for easy attachment, make it practical for dental teams. It stabilizes the patient's head, reducing time and reducing complications. The customizable sponge conforms to the patient's facial contours, ensuring a secure fit. iHeadEase is durable, cost-effective, and adaptable, ensuring long-term sustainability. Its built-in speakers provide distraction and alleviate patient anxiety, making it an innovative solution to traditional mechanical restraints. Due to its universal design, it is suitable to be used by dentists and caregivers worldwide

5. CONCLUSION

iHeadEase is a revolutionary solution to traditional mechanical restraints in dental procedures, enhancing patient comfort and safety. Its innovative features, including portable speakers and customizable sponges, make it a practical tool in modern dental practices. Its universal design, with a Velcro strap, allows easy attachment to different operators. This compassionate approach respects patients' autonomy and dignity, ensuring a more efficient, safer, and comfortable dental experience.

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