

14th

FADAS

The 14th Annual Meeting of the Federation of Asian Dental Anesthesiology Societies

Conference Chair : Takao Ayuse

Professor, Dental Anesthesiology, Course of Medical and Dental Sciences,
Nagasaki University

Program and Abstracts

Date : October 6 (Fri) – 8 (Sun), 2023

**Venue : Nagasaki International Exhibition Hall
(Dejima Messe Nagasaki)**

JDSA & FADAS Joint Symposium 1

October 7, Sat, 13 : 00-14 : 30, in Room 102

“Analgo-sedation” How Can We Manage Analgesia during Procedural Sedation?

Chair : Makoto Terumitsu (Professor, Division of Dental Anesthesiology, Health Sciences University of Hokkaido)

Hiroshi Hanamoto (Lecturer, Osaka University Dental Hospital)

〔Pain management in dental analgosedation〕

Xudong Yang (Professor, Peking University School and Hospital of Stomatology, Beijing, China)

〔Current perspectives on analgesia during procedural sedation〕

Kentaro Mizuta (Professor, Tohoku University Graduate School of Dentistry, Sendai, Japan)

〔The use of remifentanyl and ketofol in dental analgo-sedation〕

Eun-Ji Choi (Assistant Professor, Department of Dental Anesthesia and Pain Medicine, Pusan National University, School of Dentistry, Yangsan, Republic of Korea)

JDSA & FADAS Joint Symposium 2

October 9, Sat, 14 : 40-16 : 10, in Room 102

“New Possibilities of Dental Anesthesia Opened Up by AI, Metaverse, and VR”

- To the Next 50 Years

Chair : Hikaru Kohase (Professor, Division of Dental Anesthesiology, Meikai University School of Dentistry)

Ryo Wakita (Associate Professor, Tokyo Medical and Dental University, Dental Anesthesiology and Orofacial Pain Management, Graduate School of Medical and Dental Sciences)

〔Development of respiratory monitoring device using piezoelectric vibration sensor specialized for low frequency〕

Hikaru Kohase (Professor, Division of Dental Anesthesiology, Meikai University School of Dentistry, Saitama, Japan)

〔Application of virtual reality in children dental procedure〕

Cong Yu (Professor, Stomatological Hospital Affiliated to Chongqing Medical University, Chongqing, China)

〔AI and patient controlled sedation〕

Kwang-Suk Seo (Professor, Seoul National University School of Dentistry, Seoul, Republic of Korea)

**“Analgo-sedation”
How Can We Manage Analgesia during Procedural Sedation?**

Pain management in dental analgosedation

Peking University School and Hospital of Stomatology, Beijing, China

Xudong Yang

Analgosedation reduces pain and anxiety of patients during dental treatment, thus make the dental experience more pleasant. During sedation, pain control should be the top priority. The commonly used analgesics for dental sedation include Opioids, NSADs and et al. Some new medicine such as Esketamine are immerging. In order to minimize adverse effect, Opioids should be used less and multimodal analgesia is recommended.

EDUCATION :

1992-1997 Peking Medical University, Medical School

EMPLOYMENT :

2004-present Attending, Peking University School and Hospital of Stomatology

1997-2004 Resident, Peking University School and Hospital of Stomatology

“Analgo-sedation” How Can We Manage Analgesia during Procedural Sedation?

Current perspectives on analgesia during procedural sedation

Tohoku University Graduate School of Dentistry, Sendai, Japan

Kentaro Mizuta

Procedural sedation in dentistry is a widely practiced technique to alleviate patient discomfort and anxiety during dental procedures. Effective pain management is essential during procedural sedation to ensure patient comfort and the successful completion of the procedure. Multimodal analgesia, combining different classes of analgesics, has gained popularity due to its ability to improve pain control. While opioids like fentanyl have been commonly used for analgesia during procedural sedation, caution must be exercised to avoid interactions with sedative medications and the risk of respiratory depression. Incorporating local anesthetics and IV acetaminophen offers advantages, including minimizing opioid-related side effects and improving recovery profiles. Personalized approaches to analgesia are crucial to optimize pain relief and minimize adverse effects. Tailoring analgesic strategies to each patient’s specific needs and characteristics can lead to improved pain control and increased patient satisfaction. Emerging trends and innovations in analgesia during procedural sedation include the integration of non-pharmacological interventions, such as virtual reality, which have shown promise in reducing pain and anxiety levels during dental procedures. These novel approaches provide additional means to enhance patient comfort and satisfaction. Safety during analgesic administration is paramount, with close monitoring of vital signs necessary to promptly identify and manage potential adverse events. Dental anesthesiologists should possess a comprehensive understanding of appropriate analgesic dosages, potential drug interactions, and side effect profiles. Implementation of standardized protocols and regular training programs is crucial to maintaining consistent and safe practices in analgesic administration.

This presentation aims to provide an overview of current perspectives on analgesia during procedural sedation in dentistry, encompassing multimodal approaches, emerging trends, and safety considerations.

EDUCATION :

1993-1999 : Tohoku University School of Dentistry (DDS)

1999-2003 : Tohoku University Graduate School of Dentistry (PhD)

EMPLOYMENT :

2004-2007 : Postdoctoral Research Fellow, JSPS

2005-2007 : Postdoctoral Research Fellow, Department of Anesthesiology, Columbia University, USA

2007-2018 : Assistant Professor, Associate Professor, Department of Dento-oral Anesthesiology, Tohoku University Graduate School of Dentistry

2018-Present : Professor

“Analgo-sedation” How Can We Manage Analgesia during Procedural Sedation?

The use of remifentanil and ketofol in dental analgo-sedation

Department of Dental Anesthesia and Pain Medicine, Pusan National University,
School of Dentistry, Yangsan, Republic of Korea

Eun-Ji Choi

The use of propofol alone and propofol in combination with remifentanil for sedation during dental surgeries has been studied, and both methods have been found to be safe and effective when administered through a Target Controlled Infusion (TCI) pump. However, there are some interesting findings related to the combination of propofol and remifentanil.

One notable finding is that the combination of propofol and remifentanil allows for a lower propofol dose compared to propofol alone. Remifentanil is an opioid analgesic that provides potent pain relief, and when used in combination with propofol, it can enhance the sedative effects of propofol. This synergy allows for a reduction in the required dose of propofol, which can be beneficial in terms of minimizing potential side effects and promoting patient safety.

Additionally, the combination of propofol and remifentanil has been shown to result in less pain for patients during dental surgeries. Remifentanil provides effective analgesia, reducing pain sensitivity and discomfort experienced by patients.

Propofol is the most commonly used intravenous anesthetic that is currently used in various procedural sedations, including dental sedation. Its use is preferred owing to advantages of rapid onset of action, short duration of action, and easy titration. However, despite these advantages, it carries risks of respiratory depression and hemodynamic instability ; therefore, dentists are not skilled in airway management or response to emergency situations.

Ketamine is an anesthetic preferred owing to its analgesic effect and the maintenance effect on airway reflex. Nevertheless, its clinical use is controversial because of disadvantages of dissociative anesthesia, post-operative hallucinations, sympathomimetic effects, and stimulations of saliva and secretions.

A comprehensive review of various studies found that administration of ketofol, a combination of ketamine and propofol, provided effective sedation in various clinical sedation procedures, improved hemodynamic stability, did not increase the risk of respiratory depression, and resulted in rapid onset and recovery and reduced pain after the procedure.

EDUCATION :

2006 Yeungnam University, College of Medicine

2022 Doctor Degree, Pusan National University

2007-2011 Anesthesiology Resident ship Training, Yeungnam University Hospital

EMPLOYMENT :

2021-Present Assistant Professor, Pusan National University School of Dentistry, Dept. Dental Anesthesia and Pain Medicine

2015-2020 Clinical Professor, Pusan National University Yangsan Hospital, Dept. Anesthesia and Pain Medicine

“New Possibilities of Dental Anesthesia Opened Up by AI, Metaverse, and VR” - To the Next 50 Years

Development of respiratory monitoring device using piezoelectric vibration sensor specialized for low frequency

Division of Dental Anesthesiology, Meikai University School of Dentistry, Saitama, Japan

Hikaru Kohase

The compact low-frequency piezoelectric vibration sensor AYA-P (AYA-P sensor) has high sensitivity in low-frequency range and low power consumption. We are developing a respiratory monitor that detects upper airway obstruction. In this session, we will introduce the overview of development.

For patients undergoing dental treatment under intravenous sedation, AYA-P sensors were attached to the neck and abdomen, and AYA-P waveforms and capnograms were recorded at a sampling rate of 200 Hz (a). Simultaneously, the movements of the patient’s neck and abdomen were recorded on video. Based on the video recordings, including audio, the anesthesiologist determined the patient’s respiratory status at each time point for the data in (a). The patient’s respiratory status was classified into four categories : no airflow, hypoventilation, normal breathing, and artifact, by the anesthesiologist after the measurements.

We computed the power spectrum of the waveforms obtained from AYA-P every second, for a forward duration of 10 seconds. After taking the logarithm of the computed spectra, we obtained a total of 98 spectra, consisting of 49 spectra each for the neck and abdomen, with frequencies below 5 Hz. We inputted this data into the input layer of a neural network, passed it through two intermediate layers, and obtained the classification result at the output layer, categorizing it as either no airflow, hypoventilation, normal respiration, or artifact. Next, we evaluated the classification accuracy of unknown data in the neural network. We performed the analysis using two methods ; the Hold-Out method, where the data of one subject was split into training and testing datasets, and the Cross-Validation method, where all data except for the subject’s data was used as the training dataset, and the subject’s data was used as the testing dataset. Additionally, we conducted the analysis using two different approaches depend on the number of training iterations : one with a fixed number of 1000 iterations for each method, and another that terminated the training when the highest accuracy on the testing data was achieved to prevent overfitting. In total, we examined the classification accuracy using four different training methods.

When testing with data that included oneself, the Hold-Out method without preventing overfitting achieved the highest accuracy (95% accuracy). When testing with data that did not include oneself, the Cross-Validation method with preventing overfitting achieved the highest accuracy (52% accuracy).

To improve the classification accuracy, it is necessary to investigate the correlation between the characteristics of the information obtained from the AYA-P sensors and the morphological features of patients with upper airway obstruction.

EDUCATION :

1987 D. D. S. Faculty of Dentistry, Tokyo Medical and Dental Univ.

1991 Ph. D. Tokyo Medical and Dental Univ.

EMPLOYMENTS :

1993 Assist. Prof. Sec. of Anesthesiology and Clinical Physiology, Dep. of Oral restitition, Div. of Oral Health Sciences, Graduate School of Medical and Dental Sciences, Tokyo Medical and Dental Univ.

2014-present, Professor. Div. of Dental Anesthesiology, Dep. of Diagnostic and Therapeutic Sciences, Meikai University School of Dentistry

“New Possibilities of Dental Anesthesia Opened Up by AI, Metaverse, and VR” - To the Next 50 Years

Application of virtual reality in children dental procedure

Stomatological Hospital Affiliated to Chongqing Medical University, Chongqing, China

Cong Yu

Background : Due to the inherent characteristics of immersion, imagination, and interactivity in virtual reality (VR), it might be suitable for non-drug behavior management of children in dental clinics. The purpose of this trial was to measure the role of VR distraction on behavior management in short-term dental procedures in children.

Methods : A randomized clinical trial design was carried out on 120 children aged between 4 and 8 years to identify the comparative efficacy of VR and tell-show-do (TSD) to improve behavioral management during dental procedures. The primary outcomes were evaluated anxiety, pain, and compliance scores in peri-operative children.

Results : The average anxiety and behavioral scores of the VR group significantly reduced compared with the control. The decreased anxiety score for the VR group and control group were 8 (7, 11) and 5 (5, 7), $p < 0.05$. The compliance scores of the control group during treatment were 3 (2, 3), and the same in the VR intervention were 3 (3, 4), $p = 0.02$. A significant reduction in pain was observed when using VR distraction ($p < 0.05$). Comparing the length of the dental procedure, the VR group (19.02 ± 5.32 min) had a shorter treatment time than the control group (27.80 ± 10.40 min).

Conclusion : The use of VR significantly reduced the anxiety and pain of children and the length of the dental procedure and improved the compliance of children that underwent short-term dental procedures without an adverse reaction.

ACADEMIC APPOINTMENT :

2020.11 Professor, Chongqing Medical University

EDUCATION :

1995.9-2000.7 Chongqing Medical University, Bachelor

2006.9-2009.7 Chongqing Medical University, Master

2011.9-2014.7 Chongqing Medical University, PhD Visiting Scholar at the Affiliated Hospital of Munster University in Germany, Director of Department of Anesthesiology/Comfort Dentistry of Stomatological Hospital Affiliated to Chongqing Medical University

“New Possibilities of Dental Anesthesia Opened Up by AI, Metaverse, and VR” - To the Next 50 Years

AI and patient controlled sedation

Seoul National University School of Dentistry, Seoul Republic of Korea

Kwang-Suk Seo

Patient-controlled sedation (PCS), is a method of anxiety and pain control that the patient would have a way to control the administration of their sedative or anesthetic. This could be beneficial in cases where the patient has a high level of anxiety or fear about dental procedures, as it would give them some control over their own comfort level. However, this method would need to be carefully monitored to ensure that the patient does not administer too much of the sedative and to assess whether the patient is actually reducing their own anxiety or just sedating themselves to a higher degree than necessary. Artificial Intelligence (AI) can be potentially integrated into patient-controlled sedation to improve safety and efficacy. AI algorithms can use data from a patient’s medical history, body weight, age, and other factors to recommend personalized sedative doses. This can minimize the risk of over-sedation while ensuring the patient is comfortable. AI systems can continuously monitor a patient’s vital signs (like heart rate, oxygen saturation, respiratory rate, etc.) during sedation. Advanced algorithms can predict deteriorations and complications before they become critical, allowing for early interventions. AI can be used to create a feedback system that takes into account a patient’s reactions to sedation, adjusting doses as needed. For instance, if the patient shows signs of distress, the system could automatically provide additional sedation within safe limits. By analyzing the data from numerous cases, AI can help in identifying patterns and correlations that can be used to improve protocols and guidelines for patient-controlled sedation. Implementing AI in patient-controlled sedation requires careful consideration of the technical, ethical, and legal aspects. The system should have safeguards to prevent excessive sedation, and the AI algorithms should be thoroughly tested to ensure they are reliable. Also, the clinical team should always be able to override the AI system in case of an emergency or unforeseen complication. The integration of AI in this area should be seen as a tool to support, not replace, clinical judgment and expertise.

EDUCATION :

1996 Pusan National University, College of Medicine

2006 Dr. Degree, Seoul National University

1997-2001 Anesthesiology Resident ship Training, Seoul National University Hospital

EMPLOYMENT :

2023-Present, Director, Seoul National University Dental Hospital For Persons with Special Needs

2022-Present, Professor, Seoul National University School of Dentistry, Dept. Dental Anesthesiology

2022-Present, EIC, Journal of Dental Anesthesia and Pain Medicine

FADAS General Session : ePoster 1 (Basic/Clinical Research, Clinical Statistics)

October 7, Sat, 11 : 00-11 : 54, in Room 107-1

Chair : Nobuyuki Matsuura (Department of Oral Medicine and Hospital Dentistry, Tokyo Dental College, Tokyo, Japan)

F1-01 Deep learning-based prediction of difficult laryngoscopy using 3D facial scans in oral and maxillofacial surgery

1) Department of Anesthesiology, Shanghai Ninth People's Hospital, Shanghai, China

2) School of Naval Architecture, Ocean and Civil Engineering, Shanghai Jiao Tong University, Shanghai, China

○Ming Xia¹, Bei Pei¹, Yaokun Zheng², Chenyu Jin¹, Shuang Cao¹, Mingxu Zhao², Ningning Ji¹, Zhiliang Lin², Hong Jiang¹

F1-02 Hormonal mechanisms of the paraventricular nuclei in the hyperalgesia in the Parkinson's disease model rats

Department of Dental Anesthesiology, Osaka University Graduate School of Dentistry, Osaka, Japan

○Shengsen Yang, Nayuka Usami, Hiroharu Maegawa, Midori Toyama, Hiroaki Shigemasa, Mayuka Ueda, Chiho Kudo, Hitoshi Niwa

F1-03 Comparative study of the effects of TND1128 and β -NMN on spontaneous locomotor activity, reactive oxygen metabolites-derived compounds (d-ROMs) and biological antioxidant potential (BAP) in mice under hypoxic conditions

Tokyo Medical University Hachioji Medical Center, Tokyo, Japan

○Nanae Takahashi

F1-04 The effect of lidocaine on cell proliferation of myofibroblasts

Tokyo Medical and Dental University, Tokyo, Japan

○Tomoka Matsumura, Sayaka Asano, Shigeru Maeda

F1-05 mRNA expression level of IL-1 β in labial mucosal tissues with surgical injury after dexmedetomidine administration

The Nippon Dental University School of Life Dentistry at Tokyo, Tokyo, Japan

○Yukako Tsutsui, Katsuhisa Sunada

F1-06 Analysis of the impact on dental sedation trends from fatal accidents during sedation, based on Korea's health and medical big data

Department of Dental Anesthesiology, School of Dentistry, Seoul National University, Seoul, Republic of Korea

○Eunhye Choi, Seung-Hwa Ryoo, Hyuk Kim, Myong-Hwan Karm, Hyun Jeong Kim, Kwang-Suk Seo

FADAS General Session : ePoster 2 (Clinical Research 1)

October 7, Sat, 11 : 00-11 : 45, in Room 107-2

Chair : Yoshinari Morimoto (Kanagawa Dental College Graduate School, Department of Systemic Dentistry, Kanagawa, Japan)

F2-01 Would you choose general anesthesia or physical restraint to perform dental treatment for patients with special needs?

1) Department of Dentistry, Morinomiya Hospital, Osaka, Japan

2) Department of Dentistry, Bobath Memorial Hospital, Osaka, Japan

3) Department of Dental Anesthesiology, Osaka University Graduate School of Dentistry, Osaka, Japan

○Yoshinao Asahi¹, Shiro Omichi², Izuka Hayashi², Yoshino Mori², Yukimi Miyamoto², Chiaki Kato¹, Yuka Sugimoto², Miho Hyodo¹, Yoshito Takasaki¹, Hitoshi Niwa³

F2-02 Autonomic nervous system activity during perioperative period of pediatric patients

1) Department of Dental Anesthesiology, Kagoshima University Hospital, Kagoshima, Japan

2) Department of Oral and Maxillofacial Surgery, Kagoshima University Hospital

○Akari Uto¹, Kaoru Yamashita¹, Shusei Yoshimine¹, Minako Uchino¹, Toshiro Kibe², Mitsutaka Sugimura¹

F2-03 Comparison of the effective length in various preformed nasotracheal intubation tubes

1) Japan Ground Self-Defense Force

2) Japan Maritime Self-Defense Force

○Natsuki Kobayashi¹, Naotaro Nakamura¹, Ryohei Okazawa², Manabu Miki², Takeshi Ohno¹, Mutsumi Nonaka¹, Kentaro Ouchi¹

F2-04 The effects of Pressure-controlled Volume-guaranteed Ventilation (PCV-VG) on postoperative pulmonary complications (PPCs) of oral and maxillofacial patients undergoing free flap reconstruction

Peking University School of Stomatology, Beijing, China

○Yun Liu, Xudong Yang, Xin Peng, Yue Yang, Guoyong Yang, Dan Zhou, Fang Han

F2-05 Hormonal study of psychological stress for general anesthesia in patients with autism spectrum disorder, including the relationship with physical restraint

Dental Anesthesiology, Graduate School of Dental Medicine, Hokkaido University, Sapporo, Japan

○Makiko Shibuya, Yukifumi Kimura, Takayuki Hojo, Toshiaki Fujisawa, Kanta Kido

FADAS General Session : ePoster 3 (Clinical Research 2)

October 7, Sat, 11 : 00-11 : 54, in Room 108-1

Chair : Takuro Sanuki (Kanagawa Dental University, Department of Dental Anesthesiology, Kanagawa, Japan)

F3-01 Development of predicting system for success or failure of inferior alveolar nerve block anesthesia using artificial intelligence

Yonsei University College of Dentistry, Seoul, Republic of Korea

○Chanjae Lee, Eun Jeong Choi, Soo-bin Kim, Wonse Park, Seong Eun Song

F3-02 Effect of local anesthesia at the bone collection site of iliac bone grafting on autonomic nervous system activity and circulatory dynamics in the treatment of patients with alveolar cleft

1) Department of Dental Anesthesiology, Kagoshima University Hospital, Kagoshima, Japan

2) Department of Oral and Maxillofacial Surgery, Kagoshima University Hospital, Kagoshima, Japan

○Kaoru Yamashita¹, Shusei Yoshimine¹, Akari Uto¹, Minako Uchino¹, Toshiro Kibe², Mitsutaka Sugimura¹

F3-03 Trial of sensory evoked potential measurement in the trigeminal nerve for diagnosing nerve injury

1) Department of Dental Anesthesiology, Niigata University Medical and Dental Hospital, Niigata, Japan

2) Division of Dental Anesthesiology, Niigata University Graduate School of Medical and Dental Sciences, Niigata, Japan

○Yutaka Tanaka¹, Toru Yamamoto¹, Shigenobu Kurata², Naotaka Kishimoto², Kenji Seo²

F3-04 (Withdraw)

F3-05 Facial images based-deep learning analysis in predicting laryngeal view under video laryngoscope : A novel approach for difficult airway assessment

1) Department of Anaesthesiology, Shanghai Ninth People's Hospital, Shanghai, China

2) Ocean and Civil Engineering, Shanghai Jiao Tong University, Shanghai, China

○Ming Xia¹, Chenyu Jin¹, Yaokun Zheng², Jie Wang¹, Mingxu Zhao², Shuang Cao¹,
Bei Pei¹, Ningning Ji¹, Zhiliang Lin², Hong Jiang¹

F3-06 Predicting difficult mask ventilation using speech technology

1) Department of Anesthesiology, Shanghai Ninth People's Hospital, Shanghai, China

2) X-LANCE Lab, Department of Computer Science and Engineering, Shanghai Jiao Tong University, Shanghai, China

○Ming Xia¹, Shuang Cao¹, Zhikai Zhou², Zhengyang Chen², Yanmin Qian², Tianyi Xu¹,
Chenyu Jin¹, Bei Pei¹, Ningning Ji¹, Hong Jiang¹

FADAS General Session : ePoster 4 (Case Report, Clinical Statistics)

October 7, Sat, 11 : 00-11 : 54, in Room 108-2

Chair : Shinya Yamazaki (Department of Dental Anesthesiology, Ohu University Hospital, Fukushima, Japan)

F4-01 The influence of dilution of oral midazolam as a premedication in a patient with a history of delayed emergence after intravenous sedation

1) Department of Dental Anesthesiology, Okayama University Hospital, Okayama, Japan

2) Department of Dental Anesthesiology and Special Care Dentistry, Okayama University Graduate School

○Yukiko Nishioka¹, Jotaro Tanaka², Maki Fujimoto¹, Saki Miyake², Hitoshi Higuchi¹,
Takuya Miyawaki²

F4-02 Tracheal bronchus detected during general anesthesia : A case report

1) Department of Dental Anesthesia, Niigata University Medical & Dental Hospital, Niigata, Japan

2) Division of Dental Anesthesiology, Niigata University, Niigata, Japan

○Toru Yamamoto¹, Naotaka Kishimoto², Yutaka Tanaka¹, Shigenobu Kurata²,
Hiroko Kanemaru¹, Yumiko Sato¹, Yuhei Koyama¹, Yuzo Imai¹, Tomoaki Ujita¹,
Emi Sawada², Kenji Seo²

- F4-03** A case report of heart rate variability record during the onset of vasovagal reflex
- 1) Department of Dental Anesthesiology, Kagoshima University Hospital, Kagoshima, Japan
 2) Department of Oral and Maxillofacial Surgery, Kagoshima University Hospital, Kagoshima, Japan
- Shusei Yoshimine¹, Kaoru Yasmashita¹, Akari Uto¹, Minako Uchino¹, Toshiro Kibe², Mitsutaka Sugimura¹
- F4-04** Clinical study on effectiveness of intravenous patient-controlled analgesia (IV-PCA) for postoperative pain in patients undergoing oral and maxillofacial surgery
- 1) Department of Dental Anesthesiology, Okayama University Hospital, Okayama, Japan
 2) Department of Dental Anesthesiology and Special Care Dentistry, Okayama University Graduate School, Okayama, Japan
- Maki Fujimoto¹, Saki Miyake², Ayako Jinzenji¹, Kota Miyake², Yuka Honda-Wakasugi², Akiko Yabuki-Kawase², Mai Nakano¹, Midori Inoue¹, Hitoshi Higuchi¹, Takuya Miyawaki²
- F4-05** Clinical statistics on anesthetic management for dental outpatients at Okayama University Hospital for the past five years
- 1) Department of Dental Anesthesiology and Spacial Care Dentistry, Okayama University Graduate School, Okayama, Japan
 2) Department of Dental Anesthesiology, Okayama University Hospital, Okayama, Japan
- Saki Miyake¹, Yukiko Nishioka², Maki Fujimoto², Fumika Hashimoto¹, Minako Ishii-Maruhama¹, Ikue Hanazawa², Kumiko Takaya-Ishida², Takuya Saida¹, Ayaka Yamane-Hirano², Hitoshi Higuchi², Takuya Miyawaki¹
- F4-06** Establishing oral care for a blindness patient with intellectual disability using behavior modification techniques with professional oral care under intravenous sedation
- 1) Yokohama City Center for Oral Health of Persons with Disabilities, Yokohama, Japan
 2) Department of Dental Anesthesiology, The Nippon Dental University, School of Life Dentistry at Tokyo, Tokyo, Japan
 3) Yokohama Dental Association, Yokohama, Japan
- Mayumi Takei¹, Ayumi Konno¹, Masayuki Suzuki¹, Katsuhisa Sunada², Takami Kimura³, Naoto Yoshida³

F1-01

Deep learning-based prediction of difficult laryngoscopy using 3D facial scans in oral and maxillofacial surgery

¹⁾Department of Anesthesiology, Shanghai Ninth People's Hospital, Shanghai, China

²⁾School of Naval Architecture, Ocean and Civil Engineering, Shanghai Jiao Tong University, Shanghai, China

Ming Xia¹⁾, Bei Pei¹⁾, Yaokun Zheng²⁾, Chenyu Jin¹⁾, Shuang Cao¹⁾, Mingxu Zhao²⁾, Ningning Ji¹⁾, Zhiliang Lin²⁾, Hong Jiang¹⁾

【Background】 Failure to predict difficult airway is associated with morbidity and mortality. Three-dimensional (3D) scans have emerged as a tool to describe maxillofacial structure. This study aimed to present a deep learning model for difficult laryngoscopy prediction using 3D facial scans.

【Methods】 After obtaining consent, 3D scans were acquired using FaceGo pro from patients undergoing oral and maxillofacial surgery and require general anesthesia preoperatively. Patients were asked to open their mouths widely and protrude their tongues, without vocalizing during the scan. Experienced anesthesiologists performed direct laryngoscopy and graded the laryngeal view using the Cormack and Lehane (C-L) scale. Grades 3 and 4 were considered as difficult laryngoscopy (DL). The model was simplified to a 1,024-vertex mesh using furthest point sampling. PointNet++, a classical neural network for 3D point cloud, was employed for the classification task. The dataset was split into training and test sets in an 8:2 ratio. The model performance was evaluated by calculating the area under the curve (AUC), sensitivity, specificity, and accuracy with 95% confidence interval (CI).

【Results】 Among 647 patients, 108 (16.7%) had difficulty in laryngoscopic exposure. The AUC of the prediction model was 0.782 (95% CI : 0.677-0.888) with a sensitivity of 0.773 (95% CI : 0.500-0.909) and a specificity of 0.676 (95% CI : 0.324-0.800) in the test set.

【Conclusion】 The proposed deep learning model using 3D facial scans can serve as an alternative tool for predicting difficult laryngoscopy.

F1-02

Hormonal mechanisms of the paraventricular nuclei in the hyperalgesia in the Parkinson's disease model rats

Department of Dental Anesthesiology, Osaka University Graduate School of Dentistry, Osaka, Japan

Shengsen Yang, Nayuka Usami, Hiroharu Maegawa, Midori Toyama, Hiroaki Shigemasa, Mayuka Ueda, Chiho Kudo, Hitoshi Niwa

【Objective】 Hyperalgesia in Parkinson's disease (PD) model rats has been reported in prior studies, but the mechanism remains unclear. We have suggested that hyperalgesia in PD model rats may be related to changes in neuronal activity of oxytocin (OXT)-producing cells in the paraventricular nucleus (PVN). In the present study, we investigated the relationship between the arginine vasopressin (AVP) and corticotropin releasing hormone (CRH), which are regulated by the PVN in addition to OXT, and hyperalgesia in PD.

【Methods & Results】 PD model rats were made by injecting 6-hydroxydopamine into the left medial forebrain bundle of male Wistar rats, and the rotation test was performed two weeks later. The subcutaneous injection of 5% formalin solution was injected into the left upper lip of the PD model and Sham rats under anesthesia, and blood was drawn from the heart 5 or 15 minutes later, followed by perfusion fixation. PD model and Sham rats with no injection were used as control groups. Immunostaining with antibody against tyrosine hydroxylase was performed, and immunoreactivity in the left substantia nigra and striatum was found to be decreased in PD model rats. Immunostaining of the trigeminal spinal subnucleus caudalis with antibody against p-ERK revealed increased number of p-ERK-immunoreactive cells in PD model rats, indicating hyperalgesia. Double staining with each antibody against OXT, AVP and CRH in combination with antibody against p-ERK in the PVN was also performed. The OXT, AVP and CRH levels in serum without and after formalin injection were measured with ELISA kits, and the levels of OXT and CRH were significantly decreased in PD model rats than Sham rats after formalin injection.

【Conclusion】 In PD model rats, the functions related to OXT and CRH in the PVN were altered, suggesting that this may have affected the hyperalgesia to injection of formalin.

F1-03

Comparative study of the effects of TND1128 and β -NMN on spontaneous locomotor activity, reactive oxygen metabolites-derived compounds (d-ROMs) and biological antioxidant potential (BAP) in mice under hypoxic conditions

Tokyo Medical University Hachioji Medical Center, Tokyo, Japan

Nanae Takahashi

【Objective】 We previously reported that NAD^+ (nicotinamide adenine dinucleotide phosphate) enhancer TND1128 (a 5-deazaflavin derivative) has much stronger mitochondrial activity compared to β -NMN (β -nicotinamide mononucleotide). The present study aimed to compare blood-brain barrier permeability between the two drugs under hypoxic conditions.

【Methods】 TND1128 and β -NMN were administered intraperitoneally to mice, and the following 4 items were measured: 1) spontaneous locomotor activity under exposure to hypoxia for 10 minutes, 2) amount of peroxide (d-ROMs) in hydroperoxide (ROOH), which is a metabolite of reactive oxygen species and free radicals, 3) biological antioxidant potential (BAP) of endogenous antioxidants including albumin, bilirubin, reduced glutathione, and uric acid, and exogenous antioxidants such as vitamins C and E and polyphenol, and 4) measurement of potential antioxidant activity based on the BAP/d-ROMs ratio. We compared the efficacy of the two drugs based on these findings.

【Results】 Both TND1128 and β -NMN increased locomotor activity under hypoxic conditions. β -NMN tended to increase d-ROMs in a dose-dependent manner and significantly decreased BAP when administered at 1 mg/kg. However, 100 mg/kg β -NMN showed only a tendency to decrease d-ROMs, and no increasing tendency as seen with TND1128 was observed. As a result, the potential antioxidant activity of β -NMN (BAP/d-ROMs ratio) was decreased, and the difference between the two drugs was significant.

【Conclusions】 These study findings indicated that TND1128 and β -NMN can enter the brain after systemic administration and protect brain function under adverse conditions, but they have different mechanisms of action in mitochondria.

F1-04

The effect of lidocaine on cell proliferation of myofibroblasts

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Tomoka Matsumura, Sayaka Asano, Shigeru Maeda

【Objective】 Lidocaine inhibits nerve conduction, as well as suppressing proliferation and inducing apoptosis in fibroblasts mediated by G-protein-linked receptors, and involves the activity of cAMP and PKC. Myofibroblasts (MF), a differentiated form of fibroblasts, produce extracellular matrix (ECM) molecules that regulate tissue strength and resilience. However, an imbalance in ECM secretion can lead to tissue fibrosis. Although MF plays an important role in wound healing and nerve regeneration after surgical procedures, the effects of lidocaine on MF are unknown. In the present study, we investigated the effects of lidocaine on cell proliferation and apoptosis induction in MF. In addition, the cell signaling pathways involved in the inhibition of MF proliferation by lidocaine were examined.

【Methods】 Normal human dermal fibroblasts were grown in culture and stimulated with TGF- β , which induced the differentiation of dermal fibroblasts into MF. cell counting kit-8 (CCK-8) was used to investigate the viability of fibroblasts and myofibroblasts after the addition of lidocaine (0.1 and 1 mg/ml). For detection of apoptosis, 24 h after seeding, cells were treated with lidocaine (at 0.001, 0.01 and 0.1 mg/ml) and, at three days post treatment, tested with the Apoptotic/Necrotic/Healthy Cells Detection Kit. HA 1004 was used to inhibit cAMP activity and GO 6976 was used to inhibit PKC activity.

【Results】 A significant reduction in the proliferation of fibroblasts and MF was observed with 1 mg/ml lidocaine compared to untreated controls on day 3. Apoptosis was detected in MF and fibroblasts 3 days after administering 0.1 mg/ml lidocaine. We showed that lidocaine suppressed cell proliferation and induced apoptosis in MF.

【Conclusion】 Lidocaine may be a therapeutic agent for wound repair and reinnervation after surgery through the utilization of physiochemically tuned MF.

F1-05

mRNA expression level of IL-1 β in labial mucosal tissues with surgical injury after dexmedetomidine administration

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【Objective】 Dexmedetomidine (DEX), a selective α_2 -adrenoreceptor agonist, has the ability to prolong local anesthesia duration without adverse side effects such as hypertension and tachycardia. However, the mechanism of prolongation of local anesthesia duration has not been clarified. In contrast, DEX can inhibit expression levels of proinflammatory cytokines such as IL-1 β . IL-1 β can cause hyperalgesia and pain. Therefore, we hypothesized that DEX prolongs local anesthesia duration due to its ability to inhibit proinflammatory cytokine levels in the oral mucosa. The purpose of this study was to assess whether DEX inhibits IL-1 β mRNA expression levels in oral mucosa with surgical injury.

【Methods】 All experimental procedures and protocols used in the present study were approved by the Animal Care and Use Committee of the Nippon Dental University (Approval number : 18-28). Wistar rats (N=15) were assigned to control, normal saline (NS) or DEX administration groups. Samples were obtained from lower right labial mucosa of rats, which were assigned to NS or DEX administration group. The labial mucosa was incised by a scalpel blade, and NS or DEX solution was administered for 30 min. In the control group, no surgical injury was induced and no solution was administered. After administration, the mucosa in the experimental and control groups was analyzed using real time RT-PCR.

【Results】 The IL-1 β mRNA expression level of samples in the NS group was significantly higher than in the other groups. However, the IL-1 β mRNA expression level was not significantly different between the DEX administration and control groups.

【Conclusion】 These results suggest that prolongation of local anesthesia duration by DEX could be due to its ability to not increase IL-1 β level. This finding might be the mechanism of prolongation of local anesthesia duration.

F1-06

Analysis of the impact on dental sedation trends from fatal accidents during sedation, based on Korea's health and medical big data

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【Objective】 We analyzed how fatal accidents during dental sedation impacted sedation drug use in Korea, including timing of accidents, significance of drug use decreases, and normalization duration.

【Methods】 We used Korea Health Insurance Review and Assessment Service data, collecting monthly claim data for eight sedatives from 2007 to 2019. We examined online death incidents related to dental sedation in Korea, plotted monthly sedation cases on a time series chart, and applied regression and ARIMA model analysis.

【Results】 Our analysis showed significant trends following two fatalities in 2012 and 2017. Usage of the nitrous oxide-chloral hydrate-hydroxyzine complex didn't change after 2012 but reduced over 30% after 2017 without full recovery. The nitrous oxide-midazolam combination decreased in 2017, but usage rebounded. Since 2012, chloral hydrate use declined steadily. Midazolam usage wasn't affected by fatalities. Nitrous oxide use decreased significantly in 2017, recovering after two months.

【Conclusion】 Fatal accidents during dental sedation affect sedative choice. Decreases were noted in the use of chloral hydrate and nitrous oxide-chloral hydrate-hydroxyzine complex post-accidents in 2012 and 2017.

F2-01

Would you choose general anesthesia or physical restraint to perform dental treatment for patients with special needs?

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【Objective】 More than 170 years have passed since Wells and Morton's great achievement. However, in Japan, many patients with special needs receive dental treatment while fully conscious using physical restraint (PR) devices, despite the fact that dental treatment performed under general anesthesia (GA) by dentists is covered by public insurance. One reason for this is that ordinary people are unfamiliar with dental treatment under GA. We conducted this study to better understand how people perceive dental treatment under GA and PR for patients with special needs.

【Methods】 Following an explanation of dental treatment under PR and GA, questionnaires were distributed to 81 new employees joining our medical corporation on the web in March 2023. We polled 53 employees for their thoughts. The questionnaires asked about the degrees of recognition, appropriateness, necessity, and problems with both methods.

【Results】 The number of participants who answered each way unfamiliar was dental treatment under PR : 48 ; GA : 43 respectively. The number of people who chose each way better was PR : seven ; GA : 32. The minimum numbers of cavity teeth that needed to be treated were 3.0 ± 2.9 for PR and 5.0 ± 2.9 for GA. More participants responded to PR with psychological trauma and GA being expensive and requiring specialized equipment and personnel. Treatment precision and safety were considered on comparable levels.

【Conclusion】 Dentist anesthesiologists must appeal to the general public about the precision and safety of dental treatment under GA for patients with special needs when compared to PR.

F2-02

Autonomic nervous system activity during perioperative period of pediatric patients

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【Objective】 In pediatric patients, perioperative stress is often difficult to understand ; hence, it is desirable to establish objective indices. Previously, the relationship between autonomic nervous system (ANS) activity and stress has been reported. Therefore, we investigated ANS activity during the perioperative period of pediatric patients undergoing alveolar bone graft surgery under general anesthesia.

【Methods】 We included 40 patients scheduled for alveolar bone graft surgery under general anesthesia. Sympathetic activity index (LF/HF), parasympathetic activity index (HF), and heart rate were recorded during general anesthesia, 2 hours and 24 hours post-surgery, and before discharge. Correlations were determined between these parameters and the preoperative values recorded before surgery. In addition, the assessment of pain at 2 hours, 24 hours, and before discharge from the hospital was recorded.

【Results】 Preoperative LF/HF positively correlated with LF/HF 2 hours post-surgery and the day before discharge ($p < 0.05$), but not intraoperatively and 24 hours post-surgery ; Preoperative HF positively correlated with HF 2 hours, 24 hours post-surgery, and the day before discharge ($p < 0.05$), but not the intraoperative values. Heart rate was correlated with the preoperative values at all time points. In addition, 8 patients had pain at 2 hours, 21 patients at 24 hours, and 4 patients the day before discharge.

【Conclusion】 It is possible that intraoperative ANS index did not correlate with preoperative values because general anesthesia and surgical invasion cause significant fluctuations in ANS activity. Twenty-four hours after surgery, when LF/HF did not correlate with preoperative values, was when most patients complained of pain. This suggests the association between ANS activity and postoperative pain as one of perioperative stress.

F2-03

Comparison of the effective length in various preformed nasotracheal intubation tubes

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【Introduction】 Preformed nasotracheal intubation tube is often used in general anesthesia for dental procedure and oral surgery to securing the surgical field. Effective length of preformed nasotracheal intubation tube is from tip to flexion point. It is reported that the distance between tube tip and flexion point have different among manufacturers. Manufacturers are also making improvements, and there is a possibility that the effective length has been changed. In this study, therefore, we compared preformed nasotracheal tubes currently available.

【Methods】 We measured effective length (the distance between tube tip and flexion point) of inner diameters (ID) of 6.5 mm, 7.0 mm and 7.5 mm for the Parker preformed Cuffed Endotracheal Tube (Parker), the Medtronic Taper Guard RAE (Medtronic) and the Rusch AGT Nasal Preformed Cuffed Endotracheal Tube (Rusch).

【Results】 The effective lengths were 295, 305 and 315 mm (Parker, ID 6.5, 7.0 and 7.5), 270, 280 and 290 mm (Medtronic) and 270, 280 and 290 mm (Rusch), respectively.

【Discussion】 Incorrect placement of the tracheal tube can lead to serious complications such as glottis edema because of compression on the vocal cord. We reported that the appropriate tube length varies among patients of the same height (Ouchi et al., 2016). For safe and secure airway management, we should understand the specifications of each tube and select tube. In compared to the past report (Soya et al., 2002), the effective length of the Parker was increased 34, 25 and 35 mm (ID 6.5, 7.0 and 7.5 respectively), whereas the Medtronic and the Rusch had no change. It is indicated that we anesthesiologist have to get up-to-date in the product specifications, to avoid serious complications.

F2-04

The effects of Pressure-controlled Volume-guaranteed Ventilation (PCV-VG) on postoperative pulmonary complications (PPCs) of oral and maxillofacial patients undergoing free flap reconstruction

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The effects of Pressure-controlled Volume-guaranteed Ventilation (PCV-VG) on postoperative pulmonary complications (PPCs) of oral and maxillofacial patients undergoing free flap reconstruction. The effect of intra-operative mechanical ventilation modes on postoperative pulmonary complications (PPCs) after oral and maxillofacial surgery with free flap reconstruction has not been well established. We evaluated the impact of two ventilation modes on postoperative pulmonary complications in oral and maxillofacial patients undergoing free flap reconstruction. In this randomized controlled trial, 240 adults scheduled for oral and maxillofacial surgery were randomized to one of the two groups : volume-controlled ventilation and pressure-control with volume guaranteed ventilation (PCV-VG). Enhanced recovery after surgery pathways and lung protective ventilation protocols were implemented in both groups. The primary outcome was a composite of postoperative pulmonary complications within the first seven post-operative days. The outcome occurred in 53 (22%), with 25 (21%) in the volume control group, and 28 (23%) in the pressure-control with volume guaranteed group ($p=0.831$). The secondary outcomes also did not differ across study groups. In oral and maxillofacial patients undergoing free flap reconstruction, the new ventilation mode did not influence the risk of developing postoperative pulmonary complications. This is the first randomized controlled trial examining the effect of PCV-VG ventilation modes on pulmonary outcomes in oral and maxillofacial patients undergoing free flap reconstruction.

F2-05

Hormonal study of psychological stress for general anesthesia in patients with autism spectrum disorder, including the relationship with physical restraint

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【Objective】 Patients with autism spectrum disorder (ASD) are assumed to be under psychological stress during preoperative examination, including blood collection, and general anesthesia. However, information on the degrees of stress and relationship between need for physical restraint during anesthesia induction and psychological stress immediately before anesthesia is lacking. By comparing stress hormone levels, this study aimed to 1) assess the degree of psychological stress prior to blood collection on the preoperative examination day and anesthesia induction in patients with ASD and 2) determine whether patients who require physical restraint have higher levels of psychological stress than those who do not.

【Methods】 Blood was collected on the preoperative examination day and at the time of establishing an intravenous line immediately after anesthesia induction, and stress hormone levels were measured and compared.

【Results】 Fifty-eight patients participated in this study. The percentage of patients requiring physical restraint during the induction of anesthesia was 22.4% (13/58). The concentrations of cortisol and adrenocorticotropic hormone were significantly higher on the treatment day than on the preoperative day. In subgroup analysis, patients who required physical restraint and those who did not have similar results. There were no significant differences in stress hormone levels, except adrenaline, immediately after anesthesia induction between patients who required physical restraint and those who did not.

【Conclusions】 Psychological stress prior to anesthesia induction was greater than that prior to blood collection on the preoperative consultation day. Moreover, ASD patients who do not require physical restraints may feel as much psychological stress as those who do.

F3-01

Development of predicting system for success or failure of inferior alveolar nerve block anesthesia using artificial intelligence

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Inferior alveolar nerve block anesthesia (IANB) is the most commonly used local anesthetic for mandibular posterior treatment. However, it does not always lead to successful anesthesia. Failure rates of 10-39% have been reported in previous studies. Current methods for judging anesthesia success generally consider that success is based on the degree of pain of the patient by using a dental probe or decreased sensibility or numbness of the lower lip, but these diagnostic methods are difficult to express objectively. Therefore, this study aims to develop an artificial intelligence system that predicts the success or failure of anesthesia on panorama radiographs using data on the success of IANB using a pulp tester. The success of IANB was evaluated using the Pulp Vitality Tester for 250 patients who had extracted mandibular third molars at the Department of Advanced General Dentistry at Yonsei University Dental Hospital. To evaluate the success of IANB, a pulp test was performed on the canine and first molar in the same area as the mandibular third molar to be extracted before anesthetic injection. Inject anesthesia with 1.8 ml 2% lidocaine (2EA) containing 1 : 100,000 epinephrine using a 27 G needle (0.4×30 mm). After 10 minutes of IANB, apply toothpaste to the probe tip, place the tip between the gingival margin and occlusion of the tooth in the same area, and it is considered successful when 10 is read twice in a row up to the maximum output of the pulp tester (reading value 10). A deep learning model is developed through panoramic radiographs, pulp tester results, other personal information data of 250 patients. Train and verify artificial intelligence algorithms using training data with optimal hyperparameter values using a convolutional neural network (CNN). The performance of the deep learning model that predicts IANB success/failure is evaluated by Accuracy, Precision, and F1 score. The deep learning model for predicting IANB success achieved more than 90% in sensitivity, precision, and F1 score. This deep learning algorithm showed excellent performance in predicting the success of IANB anesthesia on a panoramic radiograph. It is expected to help provide useful information for clinicians' judgment.

F3-02

Effect of local anesthesia at the bone collection site of iliac bone grafting on autonomic nervous system activity and circulatory dynamics in the treatment of patients with alveolar cleft

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[Objective] In the treatment of patients with alveolar cleft, pain management at the site of bone collection in iliac bone grafting is more difficult compared to surgery site of alveolar cleft. Local anesthesia with ropivacaine, which has a long half-life in the iliac region may have analgesic effects. However, its effects on autonomic nervous activity and circulatory dynamics are unknown. This study investigated the effects of local iliac ropivacaine anesthesia under general anesthesia on the human body by analyzing changes in autonomic nervous system activity and circulatory dynamics.

[Methods] Medical records of patients who underwent iliac bone grafting surgery under general anesthesia between May 2021 and December 2022 were retrospectively analyzed. Patients with incomplete descriptions of survey items or data records were excluded. The local anesthesia administered was 0.75% ropivacaine in the iliac region at the end of surgery. Sympathetic and parasympathetic activity indices (LF/HF and HF respectively), heart rate, and systolic blood pressure were recorded 5 min before local anesthesia as controls. Data collected 5 min after local anesthesia administration were analyzed as data during administration. As comparative data, we used the analysis of 2% lidocaine with 1 : 200,000 diluted epinephrine administered intraorally and in the iliac region at the beginning of operation. Data on intraoperative and postoperative complications and presence or absence of pain at 2 and 24 h after surgery were retrospectively extracted from anesthesia and medical records.

[Results] The study included 17 patients (mean age : 9.89 ± 0.19 years ; height : 135.01 ± 1.92 cm ; mean weight : 29.79 ± 1.46 kg), including 8 males and 9 females. LF/HF was significantly higher during ropivacaine administration than before regional anesthesia ($P < 0.05$). HF, heart rate, and systolic blood pressure did not change significantly during ropivacaine administration compared with before ($P < 0.05$). Analgesic effect was observed at 2 h postoperatively ($P < 0.05$) but not at 24 h postoperatively. No intra- or postoperative complications were observed in any patients. Administration of 2% lidocaine with 1 : 200,000 diluted epinephrine at the beginning of operation under general anesthesia in the oral cavity and iliac crest increased systolic blood pressure ($P < 0.05$).

[Conclusion] 2% lidocaine with 1 : 200,000 diluted epinephrine had an effect on circulatory. Conversely, 0.75% ropivacaine did not alter circulatory dynamics, but it increased the sympathetic nervous system activity. Thus, complications associated with sympathetic hyperactivity should be noted.

F3-03

Trial of sensory evoked potential measurement in the trigeminal nerve for diagnosing nerve injury

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【Introduction】 Somatosensory evoked potentials (SEP) was established as a method for diagnosing sensory disorders in the field of spinal nerves. However, it has been believed that precise SEP recording of the trigeminal nerve was difficult because of short distance from the stimulating electrode to the recording site. Therefore, we tried to measure SEP evoked by the electrical facial stimulation and to analyze the recording pulse waves.

【Subjects and Methods】 This research was approved by Niigata University clinical ethics community (2021-0284). The subjects were normal healthy adult volunteers and patients with trigeminal neuropathy who received a sensory impairment in the facial region in the dental anesthesia clinics of Niigata University Medical and Dental Hospital. MEB-2300 NeuropackX1 (NIHON KOHDEN Co., Ltd.) was used for recording SEP and the stimulating electrode placed near the zygomatic foramen and the recording electrode measured SEP from the T3 (or T4) and C3 (or C4) electrodes opposite the stimulating electrode using the international 10-20 method. Stimulation was 5 to 30 μ V and the waveform was analyzed after 200 additive averages were performed.

【Results and Discussion】 In this study, we could detect a somatosensory evoked potentials with a latency of around 10-20 msec. And the latency received the latency by changing stimulus intensity. This analyze could be applied to the diagnose of trigeminal nerve injury.

F3-04 (Withdraw)

F3-05

Facial images based-deep learning analysis in predicting laryngeal view under video laryngoscope : A novel approach for difficult airway assessment

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[Background] Difficult airway for intubation is a challenge during airway management. This study aimed to investigate the value of facial images based deep learning in predicting the laryngeal view under the video laryngoscope.

[Methods] Patients, who were scheduled for tracheal intubation under general anaesthesia, were enrolled in this study at Shanghai Ninth People's Hospital, Shanghai, China from February to October 2021. A binary deep learning classification model was proposed and constructed with 9 facial images (taken from right front, side with open mouth and/or stick out tongue) as inputs to predict airway exposure difficulty. The ground-truth labels based on the Cormack-Lehane classification under a video laryngoscopy were obtained. Various combinations of the nine images were used to obtain the best number of facial images for the deep learning model. The performance of the proposed deep learning model was compared to those values achieved from traditional methods.

[Results] Of 4,316 recruited patients, the data from 2,785 patients, including 294 (11%) who had difficult airway exposure, were analysed. The seven-images-ensembled model (composed of left-side and right-side head position, frontal mouth opening with tongue extending position, head-up position, lower teeth biting the upper lip position, frontal neutral position, and frontal mouth opening without tongue extending position) has the receiver operating characteristic (ROC) area under the curve (AUC) of 0.751 (95% confidence interval [CI], 0.687-0.815), the sensitivity of 0.746 (95% CI, 0.627-0.847) and specificity of 0.600 (95% CI, 0.560-0.643). The prediction performance of this model was higher than any single-image based models, other ensembled images derived models, or the traditional methods (modified Mallampati classification (MMT), thyromental distance (TMD), inter-incisor gap (IIG), upper lip bite test (ULBT), sternomental distance (SMD) and horizontal length of the mandible (HLM)), in which their AUC ranges from 0.524 (95% CI, 0.488-0.560) to 0.631 (95% CI, 0.600-0.662).

[Conclusions] Facial images based deep learning analysis is feasible in predicting laryngeal exposure which may be used for difficult airway assessment but subjected to further study.

F3-06

Predicting difficult mask ventilation using speech technology

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【Objective】 Difficult mask ventilation (DMV) is a major cause for perioperative hypoxic brain injury. However, predicting DMV remains a challenge. This study aimed to provide a novel approach for DMV assessment based on speech technology.

【Methods】 Traditional clinical airway examination were conducted, and speech data (10 sentences) were collected from patients undergoing elective surgery under general anesthesia preoperatively. The definition of DMV was the inability of an unassisted anesthesiologist to ensure adequate ventilation during induction of anesthesia. We apply the deep speaker recognition technology (ECAPA-TDNN) to the prediction of DMV, and the speaker embedding is taken as the input of the support vector machine to make the final decision. We conduct ten-fold cross-validation on 1068 speakers of the training set, and 180 speakers including 24 positive samples and 156 negative samples are left out for the test set. The model performance was evaluated by calculating the area under the curve (AUC), sensitivity, specificity, and accuracy with 95% confidence interval (CI).

【Results】 The prevalence of DMV was 434/1248 (24.2%). The ECAPA-TDNN based model identified the DMV with an AUC of 0.698 (95% CI, 0.579-0.817), sensitivity of 0.583 (95% CI, 0.416-0.917), specificity of 0.846 (95% CI, 0.417-0.917), and an overall accuracy of 0.806 (95% CI, 0.478-0.872). Among traditional assessment methods, neck circumference achieved the best performance for DMV prediction, with an AUC of 0.766 (95% CI, 0.734-0.799), sensitivity of 0.724 (95% CI, 0.617-0.840), specificity of 0.702 (95% CI, 0.562-0.785), and overall accuracy of 0.705 (95% CI, 0.615-0.759).

【Conclusions】 The proposed model based on speech technology has shown potential value in difficult mask ventilation assessment, but additional studies are needed to confirm the initial findings.

F4-01

The influence of dilution of oral midazolam as a premedication in a patient with a history of delayed emergence after intravenous sedation

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【Introduction】 Oral midazolam is often used as a premedication in dental treatments for patients with disability, but delayed emergence with midazolam is a problem. We hypothesized that increasing the water dilution of midazolam would decrease its absorption from the oral mucosa and reduce its pharmacological effects. In this case report, we describe a patient with a history of delayed emergence after intravenous sedation who received oral midazolam as a premedication in modified diluted water to prevent delayed emergence.

【Case presentation】 The patient was an 18-year-old male, 165 cm and 54 kg. Because of his intellectual disability and autism spectrum disorder, he was unable to cooperate with dental treatments, so the treatments under intravenous sedation was planned. At initial sedation, the dose of midazolam 10 mg diluted in 5 mL of drinking water was administered orally. Thirty minutes after the administration, a continuous intravenous infusion of propofol was started. It took 2 hours for him to emerge from the anesthesia. At the second sedation, the dose of midazolam 10 mg diluted in 20 mL of drinking water was administered orally. Propofol was administered in the same manner as the initial sedation. It took 3 hours to emerge from the anesthesia. At the third sedation, the dose of midazolam 10 mg diluted in 30 mL of drinking water was administered orally. Propofol was administered in the same manner. As before, it took 3 hours to emerge from the anesthesia.

【Discussion】 For oral premedication at our facility manual, midazolam is usually administrated diluted with 5 mL of drinking water. However, dilution of midazolam to 4 and 6 times with the drinking water did not reduce emergence time in the present case. Thus, increasing the water dilution of oral midazolam may not influence the pharmacological effect of midazolam.

F4-02

Tracheal bronchus detected during general anesthesia : A case report

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A tracheal bronchus is a congenital abnormality of the tracheobronchial tree in which a displaced or accessory bronchus arises from the trachea superior to its bifurcation. We herein report a case in which a tracheal bronchus was incidentally found after induction of general anesthesia, and we discuss the potential airway management problems that may have ensued. An 80-year-old man was scheduled for buccal mucosa resection and abdominal skin grafting for treatment of squamous cell carcinoma of the left buccal mucosa. Because of trismus and anticipated airway difficulty, an awake intubation was performed under sedation. A 3-branched structure was incidentally observed at the first branching site that was supposed to be the carina. The tip of the endotracheal tube was repositioned 3 cm above the tracheal trifurcation, and the rest of the procedure proceeded uneventfully. A flexible fiberoptic scope is not usually used in most of anesthesia cases, making the identification of such tracheal or bronchial abnormalities more difficult. Therefore, it is important to carefully check the bronchial morphology on any available chest radiographs before surgery, listen to lung sounds after intubation, and assess thoracic lung compliance without neglecting routine safety checks.

F4-03

A case report of heart rate variability record during the onset of vasovagal reflex

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【Objective】 Vasovagal reflex is a common medical emergency during dental treatment, with unclear pathogenesis. Autonomic nervous system (ANS) activity can be quantified through heart rate variability (HRV) analysis, which examines the RR interval on an electrocardiogram (ECG). Monitoring of ANS activity during dental treatment has been attempted previously. However, there are only a few reports on the analysis of HRV during dental treatment-associated vasovagal reflex. Here, we present a record of HRV analysis during the onset of vasovagal reflex.

【Case Report】 A 23-year-old male (height : 181 cm, weight : 68 kg) was scheduled for maxillary second molar extraction. The patient had experienced vasovagal reflex twice in the past during dental treatment. The patient declined extraction under intravenous sedation out of fear and requested vital sign monitoring, providing consent for intravenous access in case of vasovagal reflex.

【Results】 During the administration of 2% lidocaine with 1/80,000 epinephrine (1.3 mL), the patient did not complain of discomfort, and vital signs were normal. However, soon we detected an increase in the high frequency (HF) component on the ECG, indicating increased parasympathetic activity associated with breathing. The patient reported discomfort, and his heart rate decreased. Therefore, leg raising was performed, and 0.05% atropine (0.5 mg) was administered intravenously. This led to a decrease in parasympathetic activity and recovery of heart rate.

【Conclusion】 In this case, real-time changes in autonomic nervous system activity during vasovagal reflex were detected by HRV analysis. We suggest that monitoring HRV with a focus on increased HF could prevent vasovagal reflexes, especially during dental treatment.

F4-04

Clinical study on effectiveness of intravenous patient-controlled analgesia (IV-PCA) for postoperative pain in patients undergoing oral and maxillofacial surgery

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【Objective】 To evaluate the usefulness of intravenous patient-controlled analgesia (IV-PCA) for postoperative pain in patients undergoing oral and maxillofacial surgery.

【Methods】 This study was conducted as a retrospective observational study, approved by the Ethical Committee of Okayama University. The study population was composed of all patients who used IV-PCA with fentanyl for postoperative pain control after oral and maxillofacial surgery under general anesthesia in Okayama University Hospital from April 2021 to March 2023. IV-PCA was performed according to the standardized protocol at our hospital : a background infusion rate of 10 microgram/h, bolus volume of 20 microgram, and a lockout interval of 10 min. The numeric rating scale of pain (NRS) was used as a pain score and we determined that mild pain is reflected by NRS scores 0 to 4, moderate pain by NRS scores 5 to 7, and severe pain by NRS scores 8 to 10. We searched for a maximum NRS until 24 hours after surgery and evaluated the usefulness of IV-PCA until 24 hours after surgery for each type of surgery.

【Results】 Sixty-one patients used IV-PCA with fentanyl for postoperative pain control. The type of surgery was categorized as follows : group 1 ; removal of oral and maxillofacial tumors and reconstruction with pedicled flap (major surgery), group 2 ; removal of oral and maxillofacial tumors and/or reconstruction (moderate surgery), group 3 ; others. Group 1, 2, and 3 were with 32, 20, and 9 patients, respectively. In group 1 (major surgery), the percentage of patients with moderate or severe pain (NRS of 5 or higher) was 56%. In group 2 (moderate surgery), on the other hands, that was 20%.

【Conclusion】 IV-PCA with fentanyl was a useful method for postoperative pain control in patients undergoing moderate surgery. On the other hands, more fentanyl should be needed for postoperative pain control with IV-PCA for major surgery.

F4-05

Clinical statistics on anesthetic management for dental outpatients at Okayama University Hospital for the past five years

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【Objective】 One of the characteristics of dental anesthesia is that anesthetic management is often performed in an outpatient setting. Therefore, we searched for dental outpatients undergoing anesthetic management at our hospital in the past five years.

【Methods】 We investigated cases of general anesthesia (GA) and intravenous sedation (IVS) for dental outpatients performed at our hospital from January 2018 to December 2022.

【Results】 The total number of cases of dental treatments or oral surgery under GA or IVS during the five years was 4,053 (male, 2,185 ; female, 1,868), of which 585 (14.4%) were under GA and 3,468 (85.6%) were under IVS. The cases of IVS for outpatients with special needs, such as intellectual disability and autism spectrum disorder (IVS for special needs) and IVS for outpatients with dental fear or gagging reflex (IVS for dental fear) were 1,660 and 1,808, respectively. The male to female ratio for special needs was approximately 65% male and 35% female and IVS for dental fear was approximately 39% male and 61% female. The mean ages of GA for special needs, IVS for special needs, and IVS for dental fear were 21.3, 35.9, and 44.5 years, respectively. By treatment, under GA for special needs, 68% were dental treatments and 32% were oral surgery, under IVS for special needs, 95% were dental treatments and 5% were oral surgery, under IVS for dental fear, 58% were dental treatments and 42% were oral surgery.

【Conclusion】 At Okayama University Hospital, anesthetic management was annually performed for about 1,000 dental outpatients. Patients with special needs were more in males, while those with dental fear were more in females. The age of patients undergoing GA was lower than that of IVS. The reason for this was thought to be that GA was applied to children, as it is difficult to maintain optimal sedation levels for IVS in children.

F4-06

Establishing oral care for a blindness patient with intellectual disability using behavior modification techniques with professional oral care under intravenous sedation

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【Objective】 Some patients with visual impairment with intellectual disability may cause emotional instability due to intellectual impairment of comprehension and judgment, resulting in adjustment disorder. We report a case of establishing home oral care in combination with temporal professional oral care with intravenous sedation for a such patient, who showed a marked rejection of oral care both at home and clinic.

【Methods】 The patient is a 39-year-old woman with blindness and severe intellectual disability. She can understand simple daily conversation and communicate verbally. Daily life assistance is provided by facility staff. At our oral health center, oral care of the patient was provided with restraint, but the patient gradually began to refuse oral care. After review of training in behavior modification techniques, we are currently training for practice to accept dental instruments and providing professional oral care under intravenous sedation.

【Results】 The patient did not understand the need for oral care and refused to accept oral care. There for oral care under intravenous sedation was performed to improve periodontal condition every 4-6 months, but no improvement was observed due to lack of home care. As the training for the acceptance of oral care at our oral health center, tooth brushing instructions using the sense of smell and touch is provided monthly to familiarize with cleaning equipment and how to recognize plaque in the teeth. The patients tend to reject dental instruments that they cannot imagine and require much time to accept. However, we consider that once recognition of the exhilaration after tooth-brushing is established, the patient can receive oral care at home.

In patients with blindness and intellectual disability, the earlier the onset of disability, the less visual information necessary for growth and development is available, and the less experiences the patients have in various situations of daily life. Although the patient could receive oral care under intravenous sedation, the treatment cannot be considered complete, we have to train the patient to acquire habit of oral care resulting change of the patient's consciousness. Thus, for blind patients, behavior modification must be implemented more based on Tell-Feel-Do method instead of Tell-Show-Do.

【Conclusion】 For oral management of the blind with intellectual disability requires an understanding of disease characteristics and implementation of appropriate behavior modification techniques to achieve acquisition of oral care habit.