ジアゼピンとオピオイドには拮抗薬が存在する。さらにプロポフォールは代謝が早く，調節性に優れている。これらの特徴をうまく引き出し，欠点を補うような投与方法を検討することは，今後のさらなる課題である。

最後に，障害者歯科における鎮静法の応用はあくまでも手段であり，最終的な結果は歯科的な管理全般の中で評価されなければならない。現在までにわれわれに施設においては欠損部の修復処置の他に，口腔清掃を主たる目的として定期的に鎮静を続けるケースが増加している[32]。今後は，すでに行われた処置がどの程度維持されるか，および口腔清掃がどの程度の効果を持つものなのかを長いスパンで評価する必要があると思われる。

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表１．鎮静法の分類

	利点	欠点
笑気吸入鎮静法	操作が簡単で安全	効果が不十分 鼻マスクの違和感
Conscious sedation	比較的安全	効果が不十分
Deep sedation	効果が十分である	リスクを伴う

表２．プロポフォール(P)とミダゾラムの投与量

P 投与時間 (min)	P平均投与速度 (mg/kg/hr)	ミダゾラム投与量	文献
55	4.4	2-3 mg/body	前田[17]
33	1.8	1-3 mg/body	楽木[21]
43.1	2.6	0.059mg/kg	笹尾[22]
72	5.7	0.31mg/kg	河合[19]

表３．鎮静法と全身麻酔の比較

	鎮静法	全身麻酔
入院・外来	基本的に外来	基本的に入院
術前検査	簡便	採血，胸部Ｘ線等
効果	処置内容による	処置によらず確実
治療時間	比較的短時間	長時間も可能
設備	比較的簡便	麻酔器，ガス配管等

III. 研究成果の刊行に関する一覧表

研究成果の刊行に関する一覧表

書籍

著者氏名	論文タイトル名	書籍全体の編集者名	書籍名	出版社名	出版地	出版年	ページ
末光茂，武田則昭	第2章 痴呆性高齢者の理解～病気の理解～	江草安彦	新・痴呆性高齢者の理解とケア	メディカルレビュー社	東京	2004	40-45
末光茂，武田則昭	第5章 痴呆性高齢者の評価と指標	江草安彦	新・痴呆性高齢者の理解とケア	メディカルレビュー社	東京	2004	138-191

雑誌

発表者氏名	論文タイトル名	発表誌名	巻号	ページ	出版年
Mori T, Takeda N, Egusa M, Nagahata S	Study on factors influencing the retention period of dental restorations in patients with disabilities.	JSDW	9	1-20	2004
Maeda S,Kita F, Miyawaki T, Takeuchi K, Ishida R, Egusa M, Shimada M	Assessment of patients with intellectual disability using the International Classification of Functioning, Disability and Health to evaluate dental treatment tolerability.	JIDR	49	253-259	2005

Ⅳ. 研究成果の刊行物・別刷

Journal of Intellectual Disability Research

VOLUME 49 PART 4 pp 253–259 APRIL 2005

Assessment of patients with intellectual disability using the International Classification of Functioning, Disability and Health to evaluate dental treatment tolerability

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Abstract

Background Patients with serious intellectual disability (ID) are occasionally unable to tolerate dental treatment when intravenous sedation or general anaesthesia (IVS/GA) is involved. In order to make a decision regarding the application of IVS/GA, the International Classification of Functioning, Disability and Health (ICF) is useful. Therefore, in this study, a set of codes involved in dental problems were chosen from the ICF, and patients with ID who could tolerate dental treatments were compared with those who could not.

Methods From preliminary interviews of six patients with ID, 16 codes were chosen, and an objective five-rank scale was then constructed for use with all chosen codes. Forty-nine ID patients who visited the Okayama University Hospital for dental treatment between January and April 2003 were evaluated. Facility workers were interviewed according to the code set chosen. The participants were then divided into two subgroups depending on their tolerability of dental treatment. The results of these groups for all 16 codes were then compared.

Results Of the 49 patients interviewed, 23 were able to tolerate the dental treatment. In the 'Activities & Participation' section of the ICF, the tolerable group showed lower disability levels with regard to d110 Watching, d540 Dressing and d550 Eating. In other sections, there were no significant differences between the groups. The code set chosen in this study and the five-rank scales in each code were useful as they enabled easy interviewing.

Conclusions The ICF was raised as a possibility for considering the application of IVS/GA for dental treatment on patients with ID. For clinical use of the ICF, it is recommended that significant codes should be selected and that the five-rank scale is used so that more objective results are obtained from interviews.

Introduction

In terms of normalization, it is considered that even patients with an intellectual disability (ID) should be given the same level of dental treatment as those

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without ID. It is, however, difficult to deal with patients with serious ID because it is hard for these individuals to understand dental treatments and therefore cooperate. If patients with ID cannot accept or tolerate dental treatments, intravenous sedation or general anaesthesia (IVS/GA) is considered. However, the application of IVS/GA varies widely, depending on the knowledge and technique of the dental surgeon, the facility's equipment, the patient's dental condition as well as the patient's tolerability. This is partly why there is very little published research regarding the application of IVS/GA in the dental treatment of patients with ID. Although IVS/GA is widely applicable for dental treatment, it requires more time, costs more and poses a greater risk than regular dental treatment. Furthermore, as ID patients gradually become familiar with dental treatment, it is often difficult to determine the application of IVS/GA (Oei-Lim *et al.* 1992), especially in cases where patients do not show any pain-related behaviour. In this study, we have attempted to use the International Classification of Functioning, Disability and Health (ICF) as a tool for considering the application of IVS/GA in dental treatments.

The World Health Organization (WHO) approved the ICF in 2001. Its aim is to provide a standard language and framework for the description of health and health-related status. It allows us to describe a patient's condition in the following four ways: 'Body Functions', 'Body Structures', 'Activities & Participation', and 'Environmental Factors'. Dental diseases such as caries and periodontitis are, theoretically, concerned with daily habits; for example, the occurrence of caries depends on the frequency of eating sugar daily, and periodontitis is brought about by inadequate oral cleaning. Persons with ID may not be able to take care of themselves for prevention of dental diseases. In this case, the problem may lie with environmental factors. Therefore, collecting information regarding environmental factors is important in managing dental diseases. Additionally, 'Activities & Participation', which includes daily activities, is related to intellectual development and is a major tool in decision-making with regard to the application of IVS/GA. Thus, the ICF covers almost all information related to the dental problems experienced by ID patients. Furthermore, patient descriptions determined by the ICF can be shared with experts in other fields.

In this study, ICF codes that were considered to be both related to dental diseases and easy for family members of ID patients or facility workers to rate were chosen. Patients were divided into two groups depending on their tolerability of dental treatments, and the ICF data of both groups were compared retrospectively.

Objects and methods

To choose the appropriate codes, an ICF check list published by the WHO was used for preliminary interviews. Six ID patients were randomly selected from individuals visiting the Okayama University Hospital and were interviewed using the ICF checklist. Codes were chosen if they described the features of a patient with regard to dental diseases, and if they could be easily checked with family members or facility workers. In addition, codes considered to be significantly associated with dental problems were selected directly from the original ICF list. As a result, 16 codes, made up of two 'Body Functions', one 'Body Structures', 10 'Activities & Participation' and three 'Environmental Factors' were chosen. For each code, an objective five-rank scale was applied (Table 1). The original ICF rating system consists of five levels: 1, no problem; 2, mild problem; 3, moderate problem; 4, severe problem; and 5, complete problem. It appeared to be difficult to rate according to this system during interviews.

In the main study, all subjects were ID patients who visited the Okayama University Hospital from January to April 2003, and who lived in two special facilities for persons with ID. The facility workers were interviewed using the 16 codes chosen in the preliminary interviews. To make the interviewing process objective, at least two workers were simultaneously interviewed for each patient. Participants were divided into two groups depending on their tolerability of dental treatments. One group consisted of patients who could tolerate regular dental treatments (tolerable group), while those in the other group had previously been treated under IVS at least once (intolerable group). Both groups were compared with each other for every code. For statistical analysis, the Mann–Whitney test was applied and statistical significance was set at $P < 0.05$. All data presented are the means ± SEM.

Table 1 Ratings of selected codes from the ICF

		Rating				
		0	1	2	3	4
Body Function						
b117	Intellectual Function	No problem	Mild problem	Moderate problem	Severe problem	Complete problem
b510	Digestion Function	Normal	Bite-sized piece	Small pieces	Liquid food	Tubing
Body Structure						
s320	Oral Structure (number of teeth)	25–	20–24	15–19	10–14	0–9
Activities & Participation						
d110	Watching	No problem	Almost	Only for favourites	In short time	Impossible
d310	Communicating	No problem	Idiomatic	Simple order	Own name	Impossible
d330	Speaking	No problem	Almost	More than 2 words	One word	Impossible
d510	Washing Oneself	No problem	Almost	Like playing	Impossible	Refusing
d5201	Caring for Teeth	No problem	Almost	Like playing	Impossible	Refusing
d530	Toileting	No problem	Wiping oneself	Desiring to urinate	Necessary for lead	Complete help
d540	Dressing	No problem	Taking out of shelf	Putting on oneself	Cooperating with help	Complete help
d550	Eating	Politely	Eating independently	Unstable in volume	Help necessary	Complete help
d560	Drinking	No problem	Spilling sometimes	Spilling often	Help necessary	Complete help
d710	Personal Interaction	Consideration	Good feeling	Handshaking	Refusing	Impossible
Environmental Factors						
e310	Immediate Family	Staying at home once a month	Staying at home several times a year	Only for events	No cooperation	Disturbing
e340	Personal Care Provider	A caregiver for 2	A caregiver for 3	A caregiver for 4	A caregiver for 5	Unstable
e355	Health Professionals	Absolute	If hoping	Regular	A bit unsatisfied	Unsatisfied

In e340 Personal Care Provider, for instance, 'a caregiver for 2' means a person caring for two persons with ID.

Table 2 Data of participants

	Epileptic	Emotionally disabled	Autistic	Total (male/female)	Age (mean ± SD)
Intolerable group	10 (43%)	4 (15%)	3 (13%)	26 (17/9)	38.5 ± 10.5
Tolerable group	14 (53%)	5 (19%)	8 (31%)	23 (15/8)	37.4 ± 7.35
Total	24 (49%)	9 (18%)	11 (22%)	49 (32/17)	–

No significant differences were observed between the two groups for each disorder.

Results

The total number of participants interviewed was 49, of which 23 could tolerate dental treatment. Epilepsy was the main complication and was observed in 49% of the participants, while emotional disability was observed in 18% and autism in 22%. There was no significant difference in the occurrence of these three disorders between the two groups (Table 2). The selected codes and the five-rank scale were useful

because they made both the interviewing and the answering processes easier, thus shortening the required time and making the study more objective.

Of the two 'Body Functions' codes, b117 Intellectual Function in the tolerable group was less disturbed (Fig. 1). Evaluation of the 'Body Structures' code, s320 Oral Structure, revealed no significant difference between the two groups (Fig. 1). Of the 10 'Activities & Participation' codes, the tolerable group showed a significantly lower level of disability with regard to d110 Watching (Fig. 2a), d540 Dressing and d550 Eating (Fig. 2b). The mean value of these 10 codes in the tolerable group was significantly lower. None of the three 'Environmental Factors' codes (e310 Immediate Family, e340 Personal Care Provider and e355 Health Professionals) differed significantly between the two groups (Fig. 3).

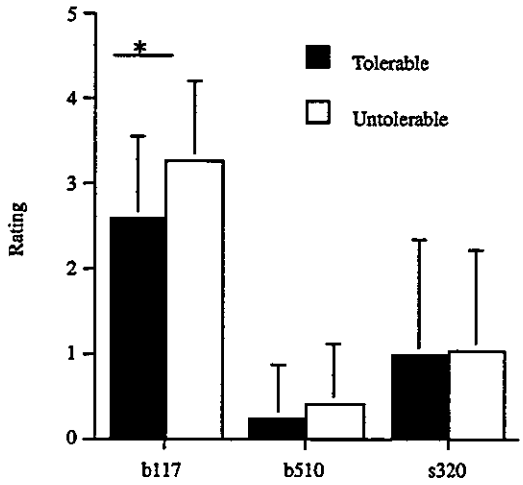

Figure 1 'Body Function' and 'Body Structure' code scores. *: $p < 0.05$.

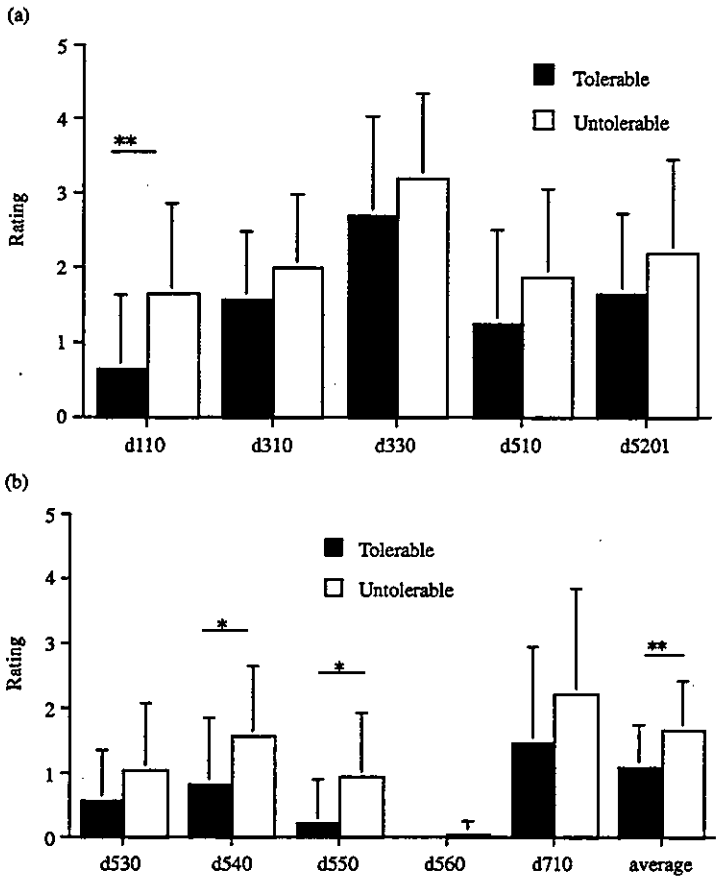

Figure 2 'Activities & Participation' code scores. The average of 10 codes showed significant differences between groups. (a) d110, Watching; d310, Communicating; d330, Speaking; d510, Washing Oneself; d5201, Caring for Teeth; (b) d530, Toileting; d540, Dressing; d550, Eating; d560, Drinking; d710, Basic Interpersonal Interaction. *: $p < 0.05$, **: $p < 0.01$.

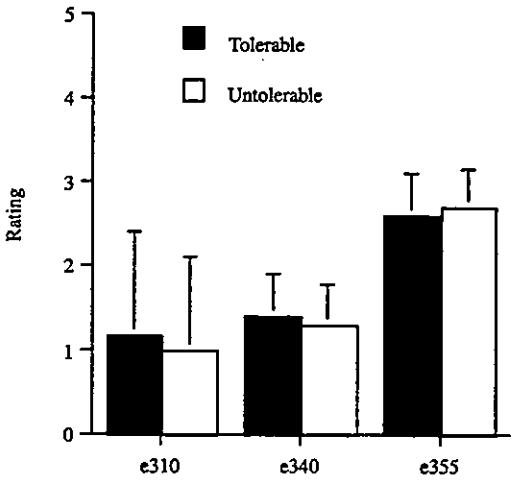

Figure 3 'Environmental Factors' code scores.

Discussion

From these results, it is possible to suggest that the set of ICF codes evaluated in this study is a useful guideline for the application of behavioural management. Until now, a common guideline for the application of IVS/GA has not been established, although methodological studies have been conducted for the application of IVS (Oei-Lim *et al.* 1992; Lindh-Stromberg 2001). Using the set of ICF codes is expected to enable easier evaluation of ID patients' tolerability of dental treatments. Because the ICF was developed as an interfacility and interoccupation common language, the ICF data should be made available to individuals in various occupations dealing with patients with ID. It is important to note, however, that dental treatments include a wide variety of different stresses; even a patient with serious ID might be able to tolerate a simple extraction. On the other hand, thorough teeth cleaning can exert a significant stress. In considering the application of IVS/GA, a dentist might make a decision based on both the results of the ICF interview and the stress level of the treatment.

Because the three 'Activities & Participation' codes, d110 Watching, d540 Dressing and d550 Eating, in which significant differences were seen, are parts of activities of daily living, they should be easily assessed by facility workers. Both dressing and eating are techniques people learn and become familiar with as they grow up. A toleration for dental treatment may require similar kinds of abilities that they are supposed to have for dressing and eating. Ratings of Dressing and Eating seem to be easy to judge when using the five ratings used in this study. This may be part of the reason why there are significant differences in these codes. In addition to these three codes, the average of the 10 'Activities & Participation' codes may be useful in considering the application of IVS/GA. Thus, a clear and synthetic evaluation seems to be adequate for our purposes.

Patients with ID have been described or categorized using various methods, each of which has been developed specifically for a certain facility and purpose (Antaki & Rapley 1996; Rogers *et al.* 1998; Dacey *et al.* 1999; Einfeld & Tonge 1999; Masi *et al.* 1999; Holland *et al.* 2000; Deb *et al.* 2001; Gonzalez-Gordon *et al.* 2002; Ross & Oliver 2002). The results obtained in these studies are therefore not transferable between facilities, especially those in different countries. Among these methods, ICD-10, which was constructed by the WHO, is used for the classification of ID (Einfeld & Tonge 1999) and it resulted in different interpretations from others because it was developed for the diagnosis of diseases and not for describing the condition of a person with ID. Both ICD-10 and ICF were constructed to work complementarily. Rogers *et al.* (1998) reported evaluations of persons with ID in social situations. This was similar to one of the ICF concepts that 'Environmental Factors' affect the abilities of people with ID. Because the ICF is a multipurpose classification system designed to serve various disciplines throughout a number of different sectors, the evaluation methods mentioned above are thought to be partially comparable to certain independent sections of the ICF.

In general, the ICF is broadly accepted as being applicable to the description of individuals with neurological deficits (Bilbao *et al.* 2003), Alzheimer's disease (Brush *et al.* 2003) and cerebral palsy (Stanger & Oresic 2003). On the other hand, various changes and improvements have been suggested. For example, as the ICF has 1424 codes in total, the WHO recommended that 3–18 codes be chosen for clinical use. This suggestion was tested and reported to be useful in each field of study (Steiner *et al.* 2002). In addition, it was also reported that the ICF system is not structured using formal terminology (Harris *et al.* 2003). For instance, to rate each code using the orig-

inal vague rating mentioned above was difficult during preliminary interviews in this study, thus consuming time and skewing results between individuals and facilities. Therefore, in this study, an objective rating system was developed for each code, which succeeded in shortening the interviewing time. However, from another point of view, not all scales are clear enough to use in interviews. This may be the reason why significant differences were not seen in several codes. Furthermore, it has been strongly recommended that the ICF should be developed or changed for efficient clinical use (Steiner *et al.* 2002; Moller 2003; Rentsch *et al.* 2003; Wade 2003). Although it has been suggested that the ICF should be modified for clinical use, it is also expected to be a powerful analytical tool to improve interdisciplinary or international communication and to introduce a systematic approach to rehabilitation tasks (Rentsch *et al.* 2003; Wade 2003). From this study it is evident that the advantages of the ICF are that it can be used as an interfacility, interdisciplinary and international tool. The results of this study show that tolerability of dental treatment may be predicted using the ICF system. Because dental diseases come from unstable daily habits, discussions with caregivers supporting ID patients may bring about a common understanding regarding dental problems. This in turn may lead to cooperation from caregivers for dental management as well as for treatment.

This is the first paper documenting the use of the ICF in dentistry. Until now, the ICF has been used mainly in rehabilitation, as the relationship between deficits and activities both in private and in society are comparatively clear. In the same way, dental diseases also have a significant relationship with daily habits and environmental factors, especially in people who cannot take care of themselves because of ID (Gabre 2000). In this study, the ICF was used only to evaluate ID patients' tolerability of dental treatments. The usefulness of the ICF for this purpose is evident from this study. However, as this is a retrospective study, a prospective study is expected to prove the usefulness of the ICF when considering application of IVS/GA. The five-rank scale may need to be improved to make interviews easier. Furthermore, in the future, results from the ICF might allow a patient's information to be shared with specialists in other fields internationally, thus aiding the development of care programs for dental problems.

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Accepted 15 March 2004