

## Dental Treatment for Handicapped Patients in Day Care Units: 2 Years' Experience at Seoul National University Dental Hospital

Chang-Joo Park, Hyun-Jeong Kim\*, and Kwang-Won Yum\*

Departments of Oral and Maxillofacial Surgery, \*Dental Anesthesiology, Seoul National University College of Dentistry, Seoul, Korea

### Abstract

#### 서울대학교 치과병원 장애인 진료실의 외래마취 하 치과치료

박 창 주 · 김 현 정\* · 염 광 원\*

서울대학교 치과대학 구강악안면외과학교실, \*치과마취과학교실

**연구배경:** 장애인의 치과치료는 일반인의 치과치료와는 달리 많은 문제점들을 가지고 있다. 이러한 장애인 환자의 치과치료를 위하여 서울대학교 치과병원에서는 치과마취과를 중심으로 임상 각 과가 협진하여 외래마취 기반 하에 1999년부터 장애인 진료실을 운영하고 있다. 이번 연구에서는 서울대학교 치과병원 장애인 진료실의 치료방법을 소개하고 그 동안 치료받은 장애인 환자들의 자료를 바탕으로 마취과적인 특징을 분석하였다.

**방법:** 2001년 1월부터 2002년 5월까지 치료받은 총 54명의 장애인 환자들의 치료기록지와 마취, 그리고 회복실 기록지를 검토하였다. 환자의 성별, 나이, 전신질환, 수술 전 시행된 검사, 치료에 참여한 협진과, 마취 유도제와 유지제, 총 마취시간과 회복실 체류시간, 그리고 회복실에서 관찰된 합병증을 조사하였다.

**결과:** 총 54명의 환자들을 대상으로 58건 치과치료가 시행되었다. 한 건의 의식진정법을 제외하고는 모두 전신마취 하에서 치과치료가 시행되었다. 마취유도제는 thiopental sodium, 근이완제는 vecuronium과 succinylcholine가 가장 많이 사용되었으며 마취 유지를 위해서는 enflurane과 isoflurane의 흡입마취제를 이용하거나 TCI를 이용한 propofol 지속정주를 이용하였다. 총 마취지속시간은  $160.2 \pm 55.5$ 분이었으며 회복실에서의 체류시간은  $132.8 \pm 50.1$ 분, 그리고 완전한 회복을 확인하기 위해 병동에 단기입원 시킨 소아환자에서는  $58.7 \pm 16.8$ 분이었다. 회복실에서 심각한 합병증은 발생하지 않았다. 지속적인 감시를 위하여 4명의 환자가 입원을 권유받았으나 특별한 합병증 없이 다음 날 퇴원하였다.

**결론:** 서울대학교 치과병원 장애인 진료실은 외래마취에 대한 기존의 연구들보다 긴 마취시간과 회복실 체류시간을 보였다. 그러나 별다른 합병증 없이 일회 방문으로 장애인 환자들에게 필요한 치과치료를 모두 제공할 수 있었다. (JKDSA 2002; 2: 21~26)

**Key Words:** Anesthesia, dental, handicapped persons

## INTRODUCTION

'Dentally' handicapped persons mean the ones who have difficulty cooperating voluntarily with the dentist for routine treatment necessary for quality dental care. They are usually exposed to high risks of dental caries and periodontal disease because they cannot adequately maintain so good oral hygiene as other people do. Additionally, some medications prescribed for their general condition, such as phenytoin, may further worsen the resulting oral condition. Furthermore, when the changes attributed to dental problems are recognized in eating habits or other actions, it is often too late (Weaver, 1995).

Even if dental treatment is inevitable, proper treatment cannot also be undergone because they are not convinced to cooperate with their caregiver or dentist. It is also difficult for them to be seated with the mouth opened for a time required for treatment. Dentists cannot waste a long time to wait for them to be prepared and once the treatment begins, they are frequently pressed for treatment time, not taking care of their general condition. These aspects totally make the situation for handicapped patients worst.

Seoul National University Dental Hospital (SNUDH) Dental Clinic for the Handicapped, working as a team of dental specialists of all clinical fields, anesthesiologists and support and recovery staff, was opened firstly in Korea on Feb, 1999. It was founded to provide comprehensive dental treatment for handicapped patients in day care units. But it began to offer dental services independently on Jan, 2001. Almost all patients were referred from general practitioners who were not able to manage them properly.

The aims of the present study were, first, to introduce our current principle and protocol at SNUDH Dental Clinic for the Handicapped, secondly to determine the anesthetic characteristics of the patients attending for dental treatment in these day care units and finally to establish the plan for better services.

## METHODS

Our treatment protocol at SNUDH Dental Clinic for the Handicapped, described as followings, has been maintained without recognizable modification.

### **The arrangement and preparation of the handicapped patient**

At the first visit, the handicapped patients with caregiver were arranged to the clinical department, the most appropriate for their chief complaint. If the patients had multiple dental problems, they were consulted to other departments needed to finish all the treatment at a single visit. Finally they were consulted to the department of dental anesthesiology. At this first visit, dental and anesthetic preoperative assessments were carried out. These assessments included taking full details of previous dental and medical histories, clinical and radiographic examination, patient's cooperability and appropriate hematological tests. Patients with no severe handicaps and no current medication had only hematologic test (routine CBC and admission panels) and others had all the tests including hematologic tests, electrocardiography and chest radiography. If any unusual finding on these assessments was detected, further tests and medical consultations were requested. The type of anesthesia was determined upon the deliberation of both dentist and anesthesiologist according to the patient's cooperability. Preoperative informed consent, including treatment plan and possible options for the dental procedure as well as the type, duration and complication of anesthesia, was obtained and the caregiver was asked to sign this form of consent. On the day before the appointment, families were checked for the preoperative and preanesthetic preparation by phone.

### **Anesthetic technique**

On the day of appointment, a final preoperative assessment was carried out by an anesthesiologist. The handicapped patients were accompanied into the operation room by a caregiver who remained until induction was completed. Intravenous catheterization was accomplished,

often impossible without premedicated sedative drugs, and then induction was initiated with thiopental 5 mg/kg. To facilitate intubation, neuromuscular blocker (vecuronium 0.1 mg/kg or succinylcholine 1 mg/kg) was given intravenously. Nasotracheal intubation was carried out for easy dental instrumentation in mouth and anesthesia was maintained with nitrous oxide and oxygen, supplemented with 1–2 vol% enflurane or isoflurane. If necessary, continuous intravenous propofol infusion via target-controlled infuser (TCI) was used with nitrous oxide and oxygen. Throughout anesthesia, patients were monitored using pulse oxymeter, capnography, measurements of indirect blood pressure, heart rate and body temperature. A complete resuscitation kit was readily available throughout the anesthetic procedure.

#### Dental treatment

After all restorative treatment was completed, procedures causing gingival bleeding such as scaling and tooth extraction were carried out at the end of treatment with strict bleeding control. One-visit endodontic treatment with amalgam or resin core was preferred. Procedures with a doubtful prognosis were avoided because handicapped patients could not keep good oral hygiene.

#### Recovery

The recovery ward, in one sector of postanesthetic care unit (PACU), was staffed by two qualified general nurses. Patients were moved to the recovery ward by the anesthesiologist and assistant. They continued to be monitored and extubation was carried out until recovery was obvious. But not a few patients, too irritable to manage properly, were allowed to move without any physical restraint under close observation. The caregiver were called into the ward as soon as the patient was conscious and were encouraged to remain until the patient was ready to be discharged. The recovery status was frequently questioned to the caregiver and ascertained. Verbal and written instructions with regard to postoperative care were given to the caregiver, together with our call number for inquiry and emergency. Asking patients to drink a glass of water slowly and confirming they could tolerate it

without any problem, we decided to discharge them from the recovery ward to return home, finally at the discretion of both the anesthesiologist and operator. All pediatric patients were ordered to stay at a ward, transferred from the recovery ward, until full recovery was ascertained.

#### Data collection

The data for this study were drawn from the patients attending for treatment at SNUDH Dental Clinic for the Handicapped from Jan, 2001 to May, 2002. All information from the patients' records including anesthetic record, recovery record and treatment record was reviewed retrospectively. Patients were classified as mentally or physically handicapped (Weaver, 1995). Cerebral palsy, paraplegia, epilepsy, or other seizure disorder were common examples of the physically handicapped. Down's syndrome, autism, hypoxic brain disease and psychological disease such as schizophrenia were classified to mental handicaps.

## RESULTS

During the 2 years' period, total 58 dental treatments for 54 patients (male 31; female 23) were carried out at the SNUDH Dental Clinic for the Handicapped (4 patients were treated in two divided visits). Their mean age was  $18.0 \pm 8.9$  years. Fig. 1 shows patients' distribution according to age. Of these patients, 42 were mentally

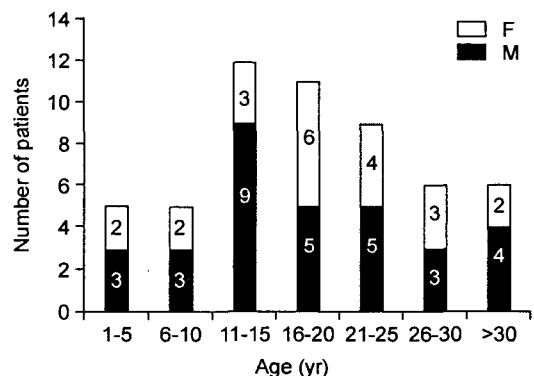


Fig. 1. Patients' distribution according to age.

handicapped and 12 physically handicapped (Table 1). For preoperative evaluation, 29 patients had only hematologic test and others had hematologic tests, electrocardiography and chest radiography. Fifteen patients needed medical consultations to their general medical practitioner because of their current medication or recent history of hospitalization.

Only one department involved in 35 cases, two departments in 18 cases. Cooperation by three departments was in 5 cases (Table 2).

**Table 1.** Patients' Classification according to the Types of Handicap

	M	F	Sum
<b>Mentally handicapped</b>			
Mental retardation	14	14	28
Autism	7	1	8
Down's syndrome	2	1	3
Schizophrenia	2	0	2
Crouzon syndrome	1	0	1
Cerebellar ataxia	1	0	1
<b>Physically handicapped</b>			
Cerebral palsy	5	1	6
Seizure disorder	2	1	3
Epilepsy	1	1	2

**Table 2.** Classification of Cases according to the Number of Clinical Department Involved in the Dental Treatment

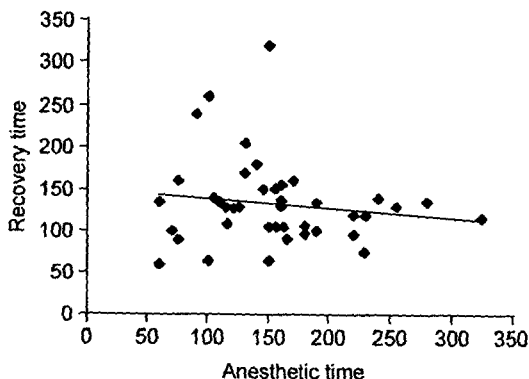
	Number of case	
Only one department involved	Ped	14
	C	14
	P	4
	O	2
	Prosth	1
Two departments involved	C+O	16
	C+P	2
Three departments involved	C+O+P	5

Ped: Department of Pediatric dentistry. C: Department of Conservative dentistry. P: Department of Periodontic dentistry. O: Department of Oral and maxillofacial Surgery. Prosth: Department of Prsthodontic Dentistry

All 54 patients, except for one patient under conscious sedation, were treated under general anesthesia. Patients were premedicated with atropine (18 cases for pediatric patients), ketamine (3 cases) and midazolam (5 cases). Thiopental sodium and vecuromium were mostly used for anesthetic induction and neuromuscular blocker, respectively. Succinylcholine was used in 6 patients. Inhalation agents (enflurane, 33 cases; isoflurane, 13 cases) were used for anesthetic maintenance but propofol (11 cases) via TCI was frequently used. Mean total anesthetic time was  $160.2 \pm 55.5$  minutes.

**Table 3.** The Postoperative and Postanesthetic Complications Observed at the Recovery Ward

	Number of patient
Total patient with any complication	28
Total patient with two or more symptoms	15
<b>Complication</b>	
Irritability	14
Nausea and vomiting	10
Postoperative pain	10
Epistaxis	9
Postoperative bleeding	7
Delayed awakening	5
Arrythmia	3
Urinary retention	2



**Fig. 2.** Scattergram showing the relationship ( $R^2 = 0.0183$ ) between anesthetic time and recovery time.  $Y = -0.1146 X + 150.49$  (Y, recovery time; X, anesthetic time).

Patients stayed at the recovery ward for  $132.8 \pm 50.1$  minutes (43 cases) and pediatric patients, prearranged to stay at a ward,  $58.7 \pm 16.8$  minutes (15 cases). 5 patients were unexpectedly hospitalized due to delayed awake (2 cases), cardiovascular instability (2 cases) and intensive wound care (1 cases), but they were discharged next day. The postoperative and postanesthetic complications observed at the recovery ward were listed at Table 3. There was no correlation between anesthetic time and recovery time (Fig. 2). No emergency visit was found after dental treatment at the SNUHD Dental Clinic for the Handicapped.

## DISCUSSION

In spite of previous medical and dental examination, the perfect explanation about treatment plan including possible options should precede treatment because complete examination and radiography were difficult to obtain prior to the induction of anesthesia. Careful preoperative informed consent will also help the caregiver to understand all the procedures accurately and to trust the treatment staff (Wong *et al.*, 1997).

The prerequisite of general anesthesia, or even sedation, is an intravenous catheterization. In handicapped patients, however, this is one of the most challenging procedure. Convincing and uninterrupted persuasion, topical anesthesia such as EMLA cream to reduce puncture pain (Cordoni and Cordoni, 2001) and sedative drugs (Petros, 1991) will facilitate this procedure.

The selection of anesthetics for out-patient anesthesia is very important particularly for the handicapped patients. Recently, intravenous anesthetics seem to be gaining ground since target-controlled infusion of propofol was introduced (Arndt *et al.*, 1995). But inhalation anesthetics remain the most popular drugs for maintenance of general anesthesia as shown in this study (Strauss *et al.*, 1998). Enflurane was mostly used but isoflurane was selected for the patients with seizure disorder to suppress EEG activation. In neuromuscular blocker, vecuronium, intermediate-acting non-depolarizing neuromuscular blocker, was mostly used. But there was still a need for succinylcholine

because of more rapid and shorter depolarizing neuromuscular blocking. It also provides for a predictive recovery without the need for reversal drugs, which are related with postoperative nausea and vomiting.

During the treatment under general anesthesia, maintenance of a patent airway while it is being shared with the operating dentist is extremely important and at times challenging (Pohl *et al.*, 1996). Repeated discussion with the operating dentist about airway maintenance should be kept in mind.

The mean duration of anesthesia in this study was approximately 165 minutes, much more prolonged than 30 minutes, the time recommended by Ogg *et al.* (1983) as suitable limit for out-patient general anesthesia. This remarkable difference may be originated from poor oral condition of handicapped people in Korea but can largely be explained by our principle that all treatment had better be finished at a single visit. Only 4 in 59 patients were treated in two divided visits because they could not tolerate long time under general anesthesia or they needed much more complicated treatments than others.

In pediatric patients, approximately 57 minutes was spent at the recovery ward before prearranged transfer to a ward. In other patients, the average time taken for recovery to discharge at the recovery ward was approximately 133 minutes, which may be regarded as quite a long time. But considering both anesthetic duration and our criteria for discharge, it can be certain that time at the recovery ward was not wasted at all. Based upon the relationship between slow recovery and increased chance for respiratory depression (Holt *et al.*, 1991), it is prudent to take care of handicapped patients for a sufficient time. At the recovery ward, caregiver who is most familiar with the handicapped patient, is strongly recommended to be accompanied to know their own baseline state, which is often difficult to know or determine their recovery (Maestre, 1996).

In complaints during recovery, the incident and symptom of morbidity appeared to be little different from those in regular patients following general anesthesia (Muir, 1976). It was also noted that the majority of symptoms recorded were minor in nature and soon resolved. Thus,

results of the present study provide little or no evidence to justify recommending hospital admission for all handicapped patients. But hospitalization criteria must be individualized for each handicapped patient to prevent emergency visit on deliberation with the operator.

In conclusion, this study shows efficient protocol to supply dental treatment to handicapped patients at a single visit in day care units and successful anesthetic results without noticeable problems. And it is also suggested that more centers with appropriate equipment and trained staff need to be established to meet the increased demand in Korea.

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