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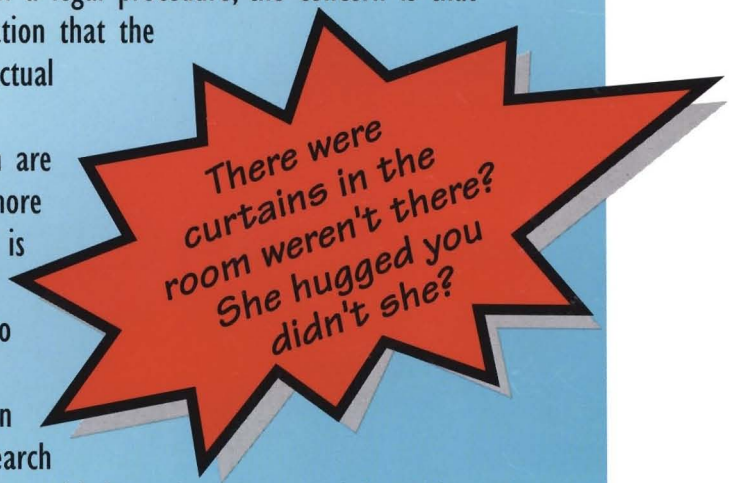
The Child as a Witness

A major problem with the testimony of children under age ten is that the younger the child, the more difficult it is for them to recall freely. In order to tap their memory, the interviewer needs to guide the recall process. This leads into the dangerous waters of suggestibility.

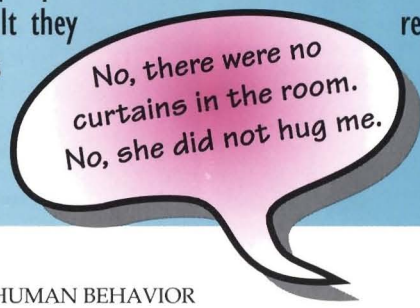
Suggestibility refers to the extent to which a witness can be led to believe details about an event that did not actually occur. In a legal procedure, the concern is that repeated interviewers will suggest new information that the witness then comes to believe is part of his actual memory.



The issue then is not whether children are vulnerable to misinformation, but how much more vulnerable are they than adults? Generally, it is agreed that by the age of ten or eleven children are no more vulnerable than adults to misleading or incorrect information. There is controversy about children between six and ten years old. With children under seven, the research indicates that they are particularly vulnerable to misinformation about peripheral facts, but not about the main event. Preschoolers are also very influenced by the adult questioning them.

A clear pattern of suggestibility evolves. Children are most susceptible to misinformation if their original memory of the area of misinformation is weak; the misinformation deals with a peripheral, not central, event; and the interviewer who provides the misinformation is an adult they respect. In one experiment, when the misinformation was provided by a child rather than an adult, it was accepted half as often.

—Mary Ann Mason Ekman



IT CAN ALWAYS BE ARGUED THAT HUMAN BEHAVIOR IS A PARTICULARLY DIFFICULT FIELD. IT IS, AND WE ARE ESPECIALLY LIKELY TO THINK SO JUST BECAUSE WE ARE SO INEPT IN DEALING WITH IT.

—*B. F. Skinner*

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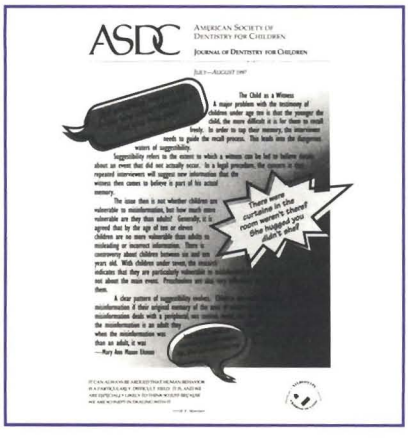

Increasingly, children are called as witnesses in physical and sexual abuse cases, in pretrial hearings and trials. Suggestibility plays a major role in their testimony.

Art and design by Sharlene Nowak-Stellmach.

CLINIC

DEMOGRAPHICS

CASE REPORTS

Calendar

1997

National Symposium on Biomaterials in Pediatric Dentistry, Radisson Hotel Metrodome, Minneapolis, MN, September 5-6.
AAON-IAPD '97, Buenos Aires, Argentina, September 17-20
Early Childhood Caries Conference, Hyatt Regency Bethesda, Bethesda, MD, October 18-19
ASDC Annual Meeting, Registry Resort, Naples, FL, October 22-26.

1998

ASDC Annual Meeting, Hyatt Regency Beaver Creek, Avon, CO, October 14-18.

CLINIC

Fluoride release of restorative materials exposed to a fluoridated dentifrice

Kevin J. Donly, DDS, MS
Jeffrey J. Nelson, BA

Water fluoridation has been shown to be an effective preventive technique for caries reduction.[1,2] In areas without water fluoridation, topical agents have been used to obtain caries protection. One of the drawbacks with topical fluoride is patient compliance, particularly with supplements and rinses. The use of toothpaste, however, is almost universal and most dentifrices contain fluoride. These fluoride-containing dentifrices have also been shown to be effective in reducing dental decay.[3,4] Thus, fluoridated dentifrice is an effective method to provide a daily application of fluoride.

The addition of fluoride-releasing restorative materials may certainly aid in caries reduction. Studies have indicated the ability of glass ionomer cements and fluoride-releasing composite resins to inhibit secondary caries at restoration margins.[5-11] Furthermore, there appears to be an immediate reduction of bacteria adjacent to fluoride-releasing materials.[12-14] We know the immediate beneficial anticaries effects of these materials; yet, can these beneficial effects be maintained? Glass ionomer cements release fluoride at relatively high levels for approximately one week, followed by a dramatic decrease, whereas fluoridated composite resins release lower levels of fluoride, through passive diffusion.[15-17] One may expect that fluoridated dentifrice would have the same fluoride uptake effects on the surface of dental materials as they do with enamel. The restoration surface is available for fluoride to be introduced into the surface. Jones *et al* demonstrated that a topical fluoride treatment of glass ionomer material increased fluoride dissemination from the material immediately, but the fluoride release was depleted within 48 hours.[18] Other studies have also noted the fluoride uptake by restorative materials, thus increasing the fluoride then released from the materials.[19-20] Daily toothbrushing may replenish this material surface fluoride level at each brushing interval; a reservoir of fluoride would potentially be available, therefore, for constant release. Should this premise be true, a certain reduction in caries would be evident. Patient compliance with mouth rinsing is not necessary; the restorative material, once placed, is maintained within the oral cavity. Not only would secondary caries be reduced at restoration margins, but the adjacent tooth could also benefit from constant fluoride release. The purpose of this study was to examine the effect a fluoridated dentifrice has on the level and rate of fluoride release of dental materials.

MATERIALS AND METHODS

Thirty standardized discs were fabricated; ten were P-50® (3M, St. Paul, MN) nonfluoridated composite resin (control), ten were Heliomolar® Radiopaque (Ivoclar/Vivadent, Amherst, NY) fluoride-releasing composite resin and ten were Ketac Fil® (ESPE, Norristown, PA) glass ionomer cement.

This research was supported, in part, by The Procter and Gamble Company and the Clinical Core Center for Oral Health Research (CCCOHR) at the University of Iowa, College of Dentistry (P-30 DE10126).

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Table □ Mean (± S.D.) fluoride release (ppm).

Material	F Dentifrice	Day 1	Day 7	Day 14	Day 21	Day 28
GIC	Yes	5.90 ± 1.39	3.07 ± 0.45	2.40 ± 0.29	2.07 ± 0.18	2.05 ± 0.24
GIC		4.29 ± 0.56	1.02 ± 0.17	0.72 ± 0.07	0.53 ± 0.08	0.47 ± 0.08
FCR	Yes	0.35 ± 0.06	0.12 ± 0.02	0.10 ± 0.02	0.10 ± 0.02	0.09 ± 0.02
FCR		0.28 ± 0.04	0.05 ± 0.01	0.04 ± 0.01	0.04 ± 0.01	0.04 ± 0.00
CR	Yes	0.21 ± 0.02	0.07 ± 0.01	0.07 ± 0.02	0.06 ± 0.01	0.06 ± 0.01
CR		0.14 ± 0.09	0.03 ± 0.01	0.03 ± 0.01	0.02 ± 0.00	0.02 ± 0.00

GIC — Glass Ionomer Cement (Ketac Fil®)
FCR — Fluoride Releasing Composite Resin (Heliomolar® Radiopaque)
CR — Composite Resin (P-50®)

The specimens were placed in separate closed environments containing 10 ml of deionized water. Twice per day (8:00 A.M. and 8:00 P.M.), half of the specimens from each group were brushed with a fluoridated dentifrice (Crest®, Procter and Gamble, Cincinnati, OH) for two minutes, rinsed, and returned to the deionized water. A fluoride-specific electrode was utilized to measure the fluoride ion level of each specimen, over a thirty-day experimental period.

RESULTS

Fluoride released (ppm) at day 1, 7, 14, 21 and 28 are presented in the Table. An analysis of variance (ANOVA) and Duncan's Multiple Range Test ($p < 0.05$) indicated significant differences in fluoride release. The brushed glass ionomer cement was significantly higher than all other groups each day and the non-brushed glass ionomer cement was significantly higher than all composite resin groups. There were no statistically significant differences between the fluoride releasing composite resin or nonfluoride releasing resin, whether brushed with a fluoridated dentifrice or not brushed.

DISCUSSION

Brushed glass ionomer cement appears to release the highest fluoride level, acting as a fluoride reservoir obtained from the dentifrice for subsequent fluoride release. Glass ionomer cement will release fluoride through passive diffusion and surface dissolution; fluoridated composite resin will release fluoride through passive diffusion. The capability of restorative materials to uptake fluoride from topical agents and subsequently release it may provide an excellent delivery system for fluoride intraorally. If a slurry of fluoridated dentifrice is provided for the oral cavity, even if toothbrushing is not performed particularly well, the fluoride can still be incorporated into the restorative material surface, which will act as a fluoride reservoir, subsequently releasing the fluoride slowly. Although there is apparent fluoride uptake and release from the restorative materials, the question of its significance on caries inhibition remains an important question, which may be addressed *in vitro* and *in vivo* through future studies.

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Calcium hydroxide pulpotomy with a light-cured cavity-sealing material after two years

Rene J.M. Gruythuysen, DDS, PhD
Karin L. Weerheijm, DDS, PhD

Calcium hydroxide among others has been used widely in dentistry, because of its antibacterial properties and its favorable biocompatibility when compared with other antibacterial agents.

In spite of its wide application in dentistry in pulp capping and pulpotomy procedures, calcium hydroxide is often not the preferred dressing for pulpotomies in the primary dentition, because of a limited clinical success rate.[1] Critical analysis of the literature suggests, however, that the results of the calcium hydroxide pulpotomy can be affected significantly by such variables as technique, the quality of the materials used, and the final restoration.[2-4]

This study focusses on the selection of an alternative pulp, cavity-sealing material, instead of zinc oxide-eugenol, because of the pulpal inflammatory response associated with the eugenol component of the cement.[5] Light-cured glass ionomer lining cements may be a viable alternative for zinc oxide-eugenol in pulpotomies.[4]

The purpose of this study is to determine the success rate of a two-year follow-up of calcium hydroxide pulpotomies with a light-cured glass ionomer lining cement as a pulp, cavity-sealing material. In addition the influence of the type of calcium hydroxide suspension, the type of restoration, and the sensitivity of the tooth before treatment are also reported.

Acknowledgement: The co-workers of the ACTA Special Dental Care Centre for their contribution to this study.

MATERIAL AND METHODS

The material consisted of 106 extensively carious primary molars in fifty-seven children. All treatments were performed within fifteen months. The patients were, on average, 5.5 years old (s.d. 1.7 years) at the time of treatment and had a history of behavioral management problems in relation to dental treatment.

The selection criteria used to include the molars in the study were:

- ☐ Absence of radiographically demonstrable morbidity.
- ☐ Little or no physiologic root resorption.
- ☐ Absence of excessive tooth mobility.
- ☐ Rubber dam isolation is possible.
- ☐ The tooth is restorable.
- ☐ Bleeding at the site of exposure of the pulp can be stopped easily.

The criteria for pain were:

- ☐ No pain, this means no pain reported by the parents.
- ☐ Moderate pain, on and off pain and or pain while eating sweets.
- ☐ Severe pain, using analgesics and or subject to a disturbed night's rest.

All pulpotomies were performed in a dental fear clinic by experienced pedodontists. The clinical procedures were standardized regarding local anesthesia and isolation with rubber dam. Pulpotomy was performed with a high-speed instrument and diamond bur with continu-

ous water spray.[2] The wound surface was touched by slightly moistened cotton pellets until bleeding stopped. A suspension of pure calcium hydroxide with either tapwater (N=45) or sterile saline (N=61) was pressed gently against the wound surface to ensure tissue contact. The excess of calcium hydroxide was removed with a spoon excavator and cotton pellets. Next the floor of the pulp chamber was covered with a lining cement (Vitrebond, 3M, USA). The calcium hydroxide supply was refreshed every three months. The teeth were restored with amalgam (Tityn, Kerr, USA) or a stainless steel crown (3M). The parents of the children were informed of the pulpotomies and were asked permission to take radiographs after one and two years. All parents agreed to these procedures.

Each pulpotomy was evaluated clinically and radiographically. Clinical diagnosis included attention to complaints of pain, abscesses or fistulae; and radiographical diagnosis included detection of pathological root resorption or bone resorption (Judgement of the radiographs interexaminer, Kappa: .73; intraexaminer, Kappa: .80).

Differences in conditions of the selected variables were tested using Chi-square tests and the t-test.

RESULTS

After one year ninety-three (87.7 percent) pulpotomies were clinically and radiographically successful. After two years, seven teeth had exfoliated, seven teeth could not be evaluated because of patient drop-out (N=6) and seventy-four pulpotomies were successful, which yielded a clinical and radiographical success rate of 80.4 percent. The reasons for extraction are indicated in Table 1. The patients who dropped out of the study could not be reached, because they had moved and their new addresses were not available.

There was no significant difference in success rate between children with only one and children with more than one tooth treated (t-test $p > 0.1$).

The result was not influenced by the type of calcium hydroxide suspension (Chi-square tests, $p > 0.1$) (Table 2).

The success rate was higher with teeth restored by a stainless steel crown (Chi-square tests, $p<0.05$) (Table 3).

The pulpotomy was successful for one of four patients with severe pain before treatment (Table 4).

DISCUSSION

The choice of a light-cured glass ionomer as a pulp, cavity-sealing material was made because of the material's good properties. For example, some light-cured glass ionomer lining cements show slight leakage and antimicrobial activities.[6,7] Moreover they can be applied easily, which is a very important property in pediatric dentistry.

The success rate in our study compares favorably with those of studies using zinc oxide-eugenol as a cavity-sealing material.[8,9]

In a limited study favorable results were obtained also after nine months in seventeen calcium hydroxide pulpotomies by controlling such variables as technique, calcium hydroxide compound (commercially hard-setting, Life), cavity-sealing material (Cavit), control of pulpal bleeding (aluminum chloride) and final restoration

Table 1 ☐ Indications for extraction of teeth (19.6 percent after two years).

Radiographical diagnosis	Clinical diagnosis no symptoms	abscess	fistula	totals
Pathological root resorption	4	2		6
Bone resorption	2	5	4	11
Root and bone resorption		1		1
	6	8	4	18

Table 2 ☐ Success rate according to type of calcium hydroxide suspension.

	Sterile saline	Water
Successful (N=74)	40	34
Failure (N=18)	10	8

Table 3 ☐ Success rate according to type of restoration.

	Amalgam	Crown
Successful (N=74)	17	57
Failure (N=18)	8	10

Table 4 ☐ Success rate according to pain before treatment.

	No pain	Moderate pain	Severe pain
Successful (N=74)	67	6	1
Failure (N=18)	15	0	3

Figure. Partial calcium hydroxide pulpotomy with a light-cured cavity sealing material in right mandibular second primary molar after eighteen months.

(stainless steel crown).[3] This treatment was successful for fifteen teeth (88.2 percent). Selection of teeth restored with a stainless steel crown in our study yielded a success rate of 92.3 percent after three additional months (twelve months). Further, we did not use a hard-setting calcium hydroxide nor we did use aluminum chloride to control pulpal bleeding as preferred by the investigators of the limited study.

The furcation surface of primary molars shows frequent accessory canals.[10] So to avoid microleakage by way of the floor of the pulp chamber, the best results can be expected when only the wound surface is covered by calcium hydroxide and not the entire floor. It takes time to remove the calcium hydroxide from the floor of the pulp chamber, however, and in this study the operators did not invoke this rule very often, because of the need to limit the treatment time for these anxious children.

In our study we saw some severe abscesses, but in a Scandinavian study only internal resorption was reported, whenever the pulpotomy had failed.[8] Perhaps this difference in result can be explained in selection of the patients. We did not exclude children with chronic health problems. For instance two pulpotomies caused an abscess in a child suffering from chronic asthmatic bronchitis. Perhaps this was accidental; but the chances are greater that the calcium hydroxide pulpotomy challenged the child's defense mechanisms. It is also possible that in a few cases virulent bacteria were able to affect these teeth because of poor diagnosis (inflamed part of the pulp tissue not totally removed) or because of microleakage.

Finally this study shows that tap-water mixed with calcium hydroxide meets the requirements of a suspension to be used as a wound dressing. Probably bacteria that are present in tap-water will be destroyed by the high pH of the calcium hydroxide.

The findings of this study encourage further research. Perhaps the good results of the present study might improve, if the pulpotomies are performed only in healthy children who have little or no pain and all pulpotomized teeth are restored with stainless steel crowns.

The results of partial pulpotomy in primary teeth proved favorable compared with the results of a traditional coronal pulpotomy using zinc oxide-eugenol as a pulp cavity sealing material.[9] Further evaluation is needed to prove whether the same results can be reached using a light-cured pulp cavity sealing material (Figure).

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Pulp response to ferric sulfate, diluted formocresol and IRM in pulpotomized primary baboon teeth

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Formocresol (19 percent formaldehyde) has been a popular pulpotomy medicament in the primary dentition, for the past sixty years. According to Avram and Pulver, in their 1989 survey, formocresol continues to be the most widely used pulpotomy medicament for vital primary teeth.[1] The search for a medicament to replace formocresol became imperative after several negative reports questioning both its local and systemic toxic side effects.[2-7]

Alternatives have been tested to maintain vitality of the radicular pulp after coronal pulp amputation. These include electrosurgery, laser, and preparations containing corticosteroids, collagens, glutaraldehyde, ferric sulfate, freeze-dried bone, bone morphogenetic protein, and osteogenic protein.[8-26]

Ferric sulfate, $Fe_2(So_4)_3$, has been used to control bleeding in endodontic surgery, and to promote gingival retraction before impression taking.[20] In contact with blood, a ferric ion-protein complex is formed, and the membrane of this complex seals the cut vessels mechanically, producing hemostasis. Another form of this agent, ferric sub-sulfate, has been widely used in skin and mucosal biopsies, and as a hemostatic agent.[27]

Landau and Johnsen used ferric sulfate to control pulpal bleeding and found favorable histologic results with 15.5 percent ferric sulfate, when compared to calcium hydroxide in primate teeth. Good clinical results utilizing ferric sulphate in human primary teeth were also reported by Fei *et al.*[20] Promising results were also described by Davis and Furtado, when presenting the preliminary figures of a clinical study employing the same solution in primary teeth of Brazilian children.[21]

The objective of this study was to assess the effect of a ferric sulfate solution and a 20 percent dilution of formocresol on pulpotomized primary teeth of baboons.

MATERIALS AND METHODS

The study sample consisted of seventy-nine primary teeth of four baboons ages between 1.5 and two years. One tooth was discarded, because of a parulis, probably due to trauma. The sampling of these teeth was done in such a way that all treatment groups were represented in every animal. For example, if eight maxillary teeth were assigned to group 1 (ferric sulfate) by the toss of a coin, eight mandibular teeth were treated with a dilution of formocresol (group 2), and the remaining four

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teeth were assigned to group 3 (IRM). The distribution of the teeth by group and follow-up time is presented in Table 1. It was appropriate to use a baboon model for this project because the anatomy, morphology, and tissue responses are most similar to humans, and the monkey is the most widely used animal to study pulpotomy agents.

Animals were anesthetized before all procedures with ketamine 10 mg/kg and Rompun (pentobarbitone) 0.1 mg/kg. One-half of the initial dose of ketamine HCl was repeated every 30-40 minutes to maintain an adequate level of anesthesia. Preoperative radiographs were made to evaluate the degree of root resorption of the teeth. Only teeth with full roots and without signs of pathosis and/or advanced resorption were included in the experiment.

Pulpotomy technique

The teeth were isolated with rubber dam and cleaned with 2 percent chlorhexidine solution. Access to the pulp chamber was gained using a #330 high speed carbide bur with water coolant. Coronal pulp resection was performed with a sterile slow speed round bur, followed by saline rinses. Hemostasis was attained by placing a cotton pellet moistened in sterile saline with slight pressure. Following hemostasis, the pulp stumps of the teeth in group 1 were painted gently for fifteen seconds with a swab moistened in a 15.5 percent solution of ferric sulfate, that was gently squirted from a syringe. The pulp chamber was then rinsed with copious amounts of water, dried with sterile cotton pellets, and covered with a soft mix of zinc-oxide-eugenol. The teeth in group 2 were covered for five minutes with a cotton pellet moistened with a solution of 20 percent formocresol.

The cotton pellet was then removed, and the pulp stumps were covered with a soft mix of zinc oxide and eugenol. The pulp stumps of the teeth in group 3 were directly covered by a soft mix of IRM after hemostasis. The teeth of all groups were sealed with IRM.

At the appropriate follow-up time listed in Table 1, the baboons were given an intravenous lethal overdose of sodium pentobarbitone. The animals were perfused first with saline and then a phosphate buffered glutaraldehyde (GTA-PBF) solution. The mandible and maxilla were removed en block and periapical radiographs of the treated teeth were exposed. Each bone was cut vertically to produce two blocks of anterior and two blocks of posterior teeth. The blocks were placed in separate bottles of GTA-PBF for twenty-four hours fixation, demineralized in 0.5 Molar EDTA, pH 7.15, for two months, and monitored radiographically.

Table 1 ☐ Distribution of the treated teeth.

Experimental groups	Follow-up time 4w	8w	Totals
1 – Ferric sulfate	16	16	32
2 – Diluted formocresol	16	16	32
3 – IRM	8	7*	15
Totals	40	39	79

w = weeks
*one tooth was not treated due to previously existing parulis

Table 2 ☐ Distribution of the assessed teeth.

Experimental groups	Follow-up time 4w	8w	Totals
1 – Ferric sulfate	15	16	31
2 – Diluted formocresol	15	16	31
3 – IRM	8	7	15
Totals	38	39	77

w = weeks

Table 3 ☐ Degree of inflammation in the different groups.

Degree of inflammation	Experimental groups: Ferric N	%	Formocresol N	%	IRM N	%	Totals
None or mild	18	(58)	15	(48)	11	(73)	44
Moderate	1	(3)	3	(10)	0	(0)	4
Severe	11	(35)	9	(29)	1	(7)	21
Necrosis	0	(0)	0	(0)	2	(13)	2
Abscess	1	(3)	0	(0)	1	(7)	2
Rt. resorption	0	(0)	4	(13)	0	(0)	4
Totals	31		31		15		77

Upon complete demineralization, the individual teeth were dehydrated in graded alcohol, embedded in paraffin and serially sectioned at five microns thickness. Every fifth section was collected, stained with hematoxylin and eosin and examined under a light microscope.

Evaluation

Two teeth had to be discarded due to poor histological preparation. The number and distribution of the assessed teeth is presented in Table 2. The two investigators (A.F. and E.E) blindly evaluated the samples histologically under a light microscope, and were calibrated before examination. All categories for evaluation were clearly and agreeably delineated, and in case of disagreement, reevaluation of the slide in question was performed until agreement was met.

Inflammation was assessed according to criteria modified from Horsted *et al*, as follows:

0- none or mild—vital pulp, absence of inflammation or a few inflammatory cells limited to the pulpotomy site.

1- moderate—inflammation evident below the pulpotomy site, but limited to the coronal third of the radicular pulp.

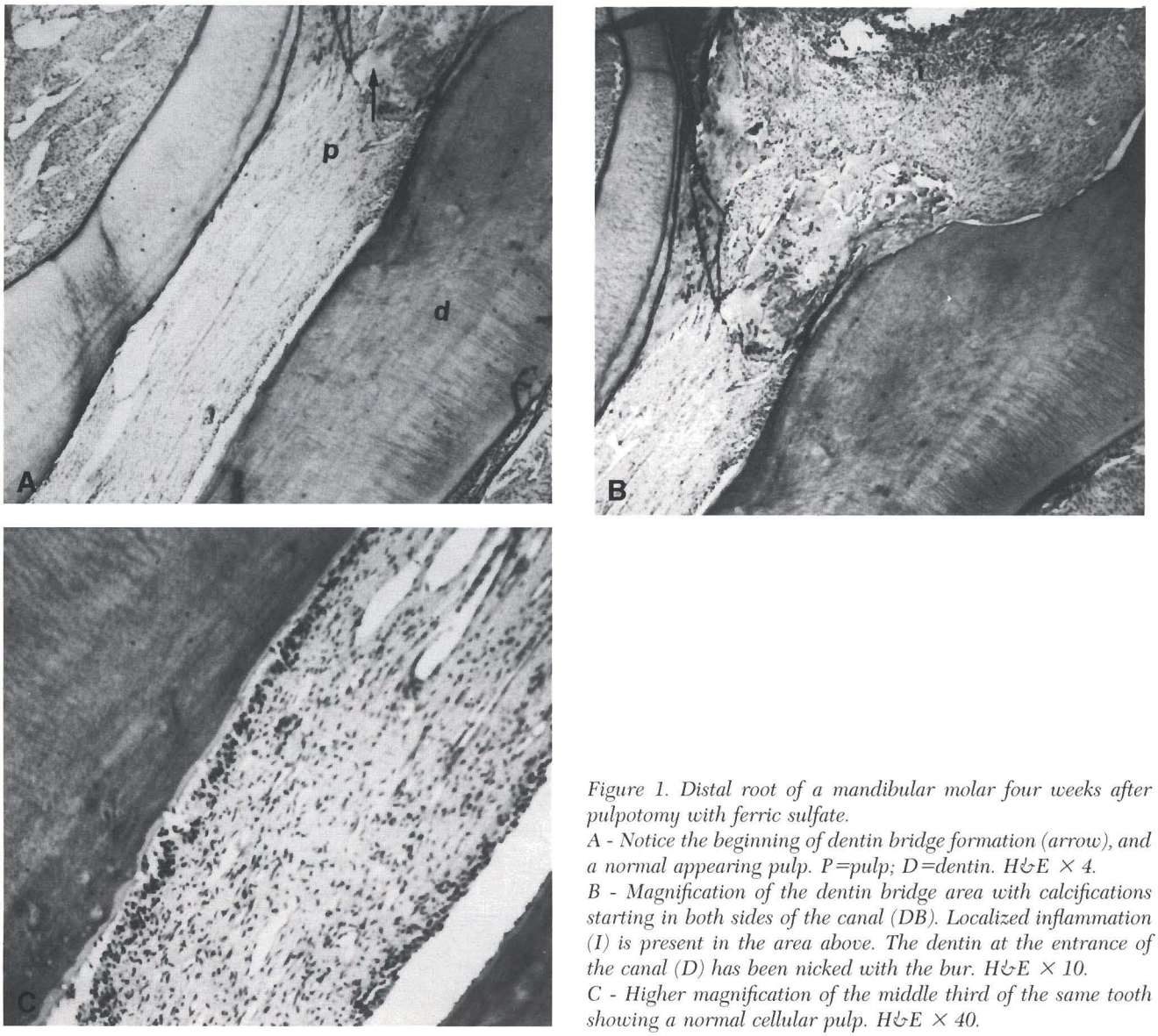

Figure 1. Distal root of a mandibular molar four weeks after pulpotomy with ferric sulfate.
A - Notice the beginning of dentin bridge formation (arrow), and a normal appearing pulp. P=pulp; D=dentin. H&E × 4.
B - Magnification of the dentin bridge area with calcifications starting in both sides of the canal (DB). Localized inflammation (I) is present in the area above. The dentin at the entrance of the canal (D) has been nicked with the bur. H&E × 10.
C - Higher magnification of the middle third of the same tooth showing a normal cellular pulp. H&E × 40.

2- severe—inflammation and circulatory disturbances affecting most of the pulp (including partial necrosis).

3- necrosis.

4- periradicular or interradicular abscess.

5- abscess including pathologic root resorption.[28]

In addition, the presence or absence of a dentin bridge was also evaluated. The data were collected and the differences between the groups analyzed utilizing a chi-square test.

RESULTS

As the results were similar in both follow-up times, they were pooled, and are presented together. The findings are summarized in Table 3. Mild or no inflammation was found in 58 percent (18/31) of the teeth in the ferric sulfate group (1), in 48 percent (15/31) of the teeth of the formocresol group (2), and in 73 percent (11/15) of the teeth of the IRM group (3). Severe inflammation was found in 35 percent (11/31 teeth) of group 1, 29 percent (9/31 teeth) of group 2, and in 7 percent (1/15 teeth) for group 3. No statistically significant difference between the three groups was observed for degree of inflammation, periradicular or interradicular abscess, or inflammatory root resorption (chi-square $p>0.05$). Dentin bridges were observed in 52 percent (16/31) of the teeth in group 1, 52 percent (16/31) of those of group 2, and in 73 percent (11/15) of those of group 3. No

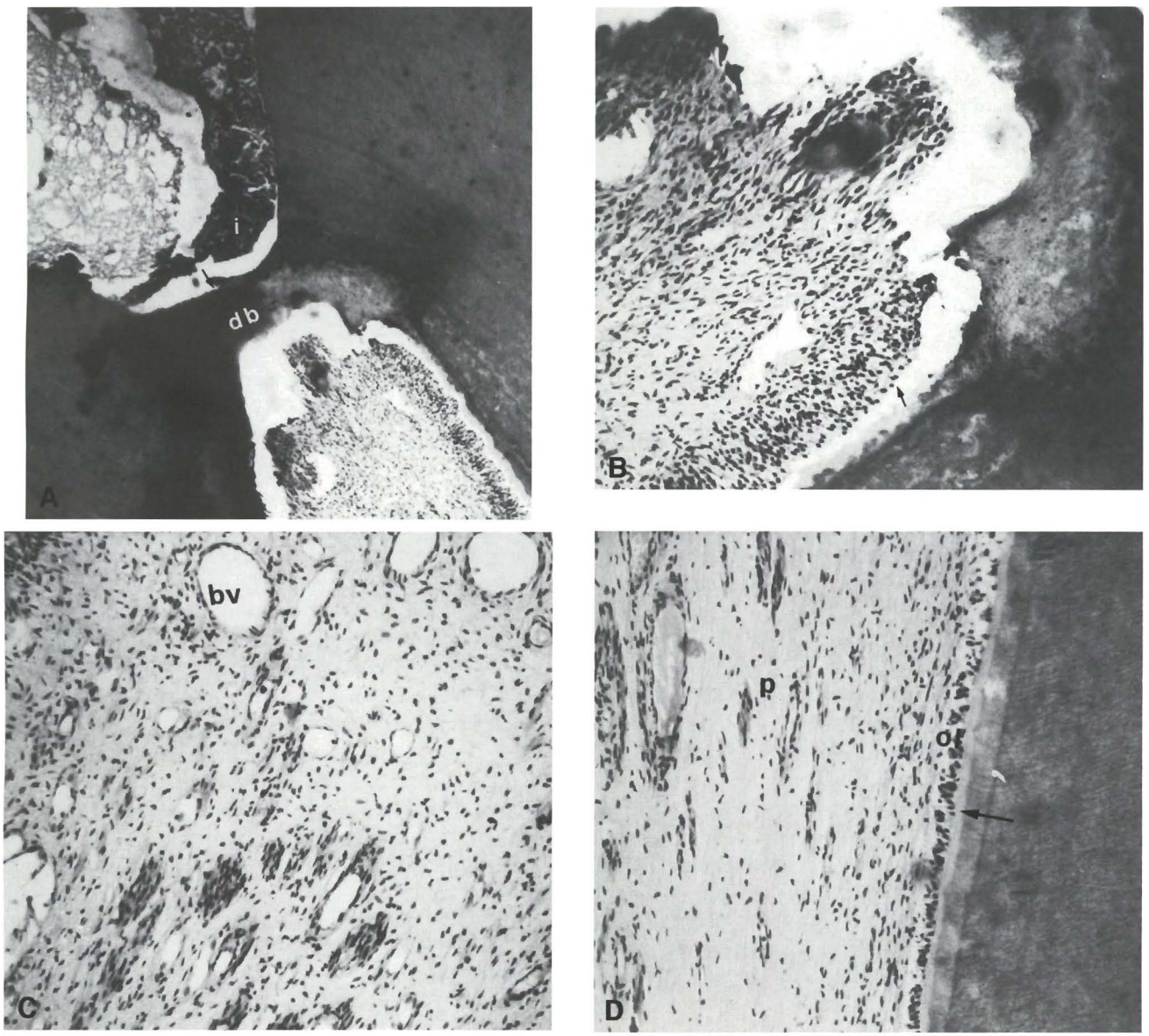

Figure 2. Mesial root of mandibular molar 8 weeks after treatment with diluted formocresol.
A - View of the tooth at the entrance of the canal. Notice incomplete removal of dentin (arrow), dentin bridge formation (DB), and remaining tissue at the pulp chamber (I) under the IRM. H&E × 10.
B - Higher magnification of the bridge area showing a normal odontoblastic layer (arrow). H&E × 40.
C - Higher magnification of the cervical third of the pulp canal showing blood vessels (BV), and a normal cellular pulp. H&E × 75.
D - High magnification of the middle third of the pulp canal showing normal odontoblastic layer (OL), predentin (arrow) and normal cellular pulp (P). H&E × 75.

difference was found between the experimental and control groups for dentin bridge ($p>0.05$). Representative micrographs of teeth of the three groups can be seen in Figures 1 and 2.

DISCUSSION

The pulpotomy procedure for primary teeth is indicated when the infected coronal tissue can be amputated and

the remaining radicular tissue is judged to be vital, or affected but still vital, by clinical and radiographic criteria. The main objective of this treatment modality today is to maintain the vitality of the majority of the radicular pulp.[29] It has not been, however, always so. The first approach to pulpotomy in primary teeth was the multiple visit formocresol technique introduced by Sweet, and was designed to produce devitalization and complete mummification of the tissue. When completely fixed, the radicular pulp was theoretically sterilized and devitalized, obviating infection and internal resorption. This treatment protocol was apparently highly successful.[30]

The number of visits has been reduced over the years, probably due to economic and behavior management reasons (for review see Ranly, 1994). The five-minute formocresol protocol has been widely utilized since the late sixties, but the original "advantage" of complete mummification - sterilization and metabolic suppression - was lost.[31,32] The short treatment leaves the pulp chronically inflamed, and susceptible to abscess formation and internal root resorption.[2,30]

Various treatment modalities have been proposed, leading to only minimal insult to the tissue. Included in this category are zinc oxide eugenol, glutaraldehyde and ferric sulfate. These agents, although not capable of initiating an inductive process, conserve or preserve the vitality of most or all the radicular pulp.[30]

Recent experiments with bone and dentin formation demonstrated that bone morphogenetic protein (BMP) will promote dentinogenesis, and stimulate dentin bridge formation.[24,25] As soon as they will be commercially available for experimentation and clinical trials, these new techniques will definitely lead to a new era in pulpotomy therapy, with healing as the guiding principle.[30]

Ferric sulfate, a non-aldehyde chemical, has been proposed as a pulpotomy agent, on the assumption that it might prevent problems originating from clot formation, reducing the chances for chronic inflammation and internal resorption, without the toxic side effects of the formocresol.[33]

In the present study, ferric sulfate and dilute formocresol produced similar pulp responses, as measured by the degree of inflammation, the presence of dentin bridges and abscess formation.

One should keep in mind, however, that only 60 percent of the pulps treated were normal, and the remaining 40 percent had severe inflammation, with a few presenting abscess formation (Table 3). Another point to be considered is the long- term pulp response to a certain technique. In the present study, half of the teeth were examined four weeks postoperatively, and the other half after eight weeks. The results were similar and pooled, but we do not know the fate of the inflammatory response at a more extended observation time.

The results of the present histologic study in baboons compares unfavorably to a recent clinical report in children.[34] In that study, where pulpotomies with ferric sulfate and diluted formocresol were followed up to thirty-four months, success rates of 92.7 percent and 84 percent, respectively, were observed for both pulp medicaments. It should be emphasized that these pulpotomies were performed following caries exposure of the pulp, which implies that some of them had an infected or inflamed coronal pulp. Clinical success does not necessarily follow, however, in histologically normal pulps. Chronic inflammation of the pulp, without periapical or interradicular abscess formation may be clinically and radiographically normal. Opposite results were observed when an animal study was compared to a human clinical experiment, both utilizing a 2 percent buffered glutaraldehyde solution.[15,16] In the clinical study, 25 percent of the children presented extensive internal resorption after twenty-five months, whereas normal pulps were observed in the baboons, even twenty-four weeks postpulpotomy.

Abscess formation and periapical or interradicular abscesses were rare: only one tooth of the ferric sulfate group and one of the IRM showed abscess formation. Moreover, dentin bridges were present in 73 percent of the teeth treated with IRM. These results are particularly favorable, and differ completely from Fadavi and Anderson's findings, which had no dentin bridges formed after six weeks, and at six months, six out of seven teeth had necrotic pulps.[23] These differences could be explained by differences in the study protocols: in the present study, IRM was placed directly over the pulp stumps, and the second layer was used to seal the teeth, thus preventing microleakage. Fadavi and Anderson covered the pulp stumps with tin foil, followed by IRM and amalgam. The difficulty in condensing this multilayered filling in monkey's teeth could have resulted in microleakage, the main reason for pulp inflammation and necrosis.[35]

CONCLUSION

Although only 60 percent of the teeth treated with ferric sulfate presented with normal pulps, these responses were similar to those of dilute formocresol. More clinical studies are encouraged before ferric sulfate can be rec-

ommended as a pulpotomy medicament in clinical practice.

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In vitro susceptibility of *Staphylococcus aureus* including MRSA to four disinfectants

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The prevention of the horizontal transmission of bacteria and virus strains has become increasingly more important in dental clinics. The surfaces of staff's hands, the environment and instruments are all contaminated with saliva, blood, exudate, and organic debris in routine dental treatment. The role of the hands of the dental staff is regarded as critical for the prevention of widespread contamination.[1] Previous studies have observed the long-term survival of pathogenic organisms on a variety of clinic surfaces, and the potential of contaminated surfaces to transmit infections.[1-3] These surfaces should be sterilized thoroughly, but for some of them sterilization is impossible to achieve. Disinfection is the next best option, and many commercial disinfectants have thus been tried for disinfection of contaminated surfaces.

Although *Staphylococcus aureus* is an infrequently encountered bacterium in the dental community, it should not be ignored that it causes infectious diseases even in the oral cavity.[4,5] Methicillin-resistant *S. aureus* (MRSA) is known to be an important pathogen involved in nosocomial infections.[6,7] We previously reported that even healthy children can harbor *S. aureus* in their oral cavities.[8] Because the incidence of MRSA among infants, elderly and compromised hosts can create serious conditions, it is important to prevent the horizontal transmission of MRSA especially in university dental hospitals that are frequented by many compromised patients.[9] Unfortunately some MRSA strains have a tolerance to disinfectants as well as antibiotics.[10,11] The effective use of disinfectants against MRSA must be based on a clear demonstration of the vulnerability of MRSA to particular disinfectants.

In this study, we compared the ability of four skin disinfectants to prevent horizontal transmission of MRSA in the dental office, testing them against *S. aureus* isolated from the oral cavities of children.

MATERIALS AND METHODS

Bacteria

Four strains of *Staphylococcus aureus* were isolated by swabbing the tongues of children who visited our clinic in 1992 (Table 1). Aside from having dental disease, all children were considered to be in good health. The subjects and their guardians participated after receiving sufficient explanation and providing informed consent. The protocols for isolating strains and for determining the coagulase types were described previously.[8] Susceptibility to methicillin was tested by a microbroth dilution method.[8] Strains 1 and 2 were isolated from the same family. Strain 1 was MSSA (methicillin susceptible) iso-

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Table 1 □ Characterization of *Staphylococcus aureus* isolates.

Strain	Host's sex (age)	Coagulase type	Minimal inhibitory concentration of methicillin (μg/ml)
1 (MSSA)	Male (7y0m)	III	0.25
2 (MRSA)	Female (4y8m)	III	64
3 (MSSA)	Male (4y3m)	I	0.25
4 (MRSA)	Male (4y3m)	I	32

Strain 2 was isolated from the younger sister of the boy from whom strain 1 was isolated.
Strains 3 and 4 were isolated from the same child.

Table 2 □ Disinfectants and their concentrations.

Disinfectants	In-use concentrations (w/v)
Povidone iodine	10%*
Benzalkonium chloride	0.05%
Chlorhexidine gluconate	0.1%
Ethanol	70%

*1% of available iodine

lated from a seven-year-old boy. Strain 2 was MRSA isolated from his younger sister. These showed the same coagulase type. Strains 3 (MSSA) and 4 (MRSA) were isolated from the same child. Thus, he harbored both MRSA and MSSA.

Disinfectants and viability testing

Table 2 lists the four disinfectants and their in-use concentrations tested. They were purchased commercially, and except for 70 percent ethanol, were commercial formulations. The product names are not given to avoid recommendation of a particular product. The disinfectants were diluted with distilled water to give tested concentrations. At these concentrations, povidone iodine and benzalkonium chloride can be used for skin and mucous membrane. Chlorhexidine gluconate and ethanol are used for skin. Chlorhexidine gluconate use on oral mucous membrane is not permitted in Japan. The antimicrobial activities of the disinfectants were assessed by their effect on viable cell numbers of each of the four strains. Overnight cultures of the strains were harvested and suspended with distilled water. The suspension was added to the diluted disinfectant to give a final concentration of 2×10^7 cells/ml. Then, after exposure for 0.5, 1, 3, 10 and 30 minutes at room temperature, 100 μl of the sample were removed, added to 1 ml glucose peptone broth with lecithin and polysorbate 80 (Daigo®; Nippon Seiyaku Co., Tokyo, Japan) to neutralize antimicrobial activity, and centrifuged immediately. The precipitated cells were suspended with the same broth in 100 μl and plated on a Daigo® agar plate. After incubation for 72 hours at 30°C, the numbers of colonies were counted.

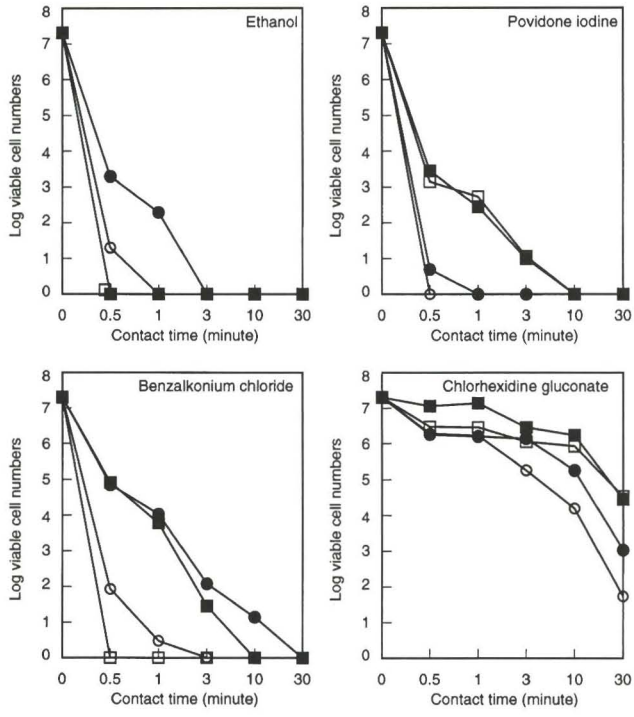

Figure. The effect of the disinfectants on viable cell numbers of Staphylococcus aureus *isolates.* ○, *strain 1 (MSSA);* ●, *strain 2 (MRSA);* □, *strain 3 (MSSA);* ■, *strain 4 (MRSA).*

RESULTS

As shown in the Figure, the 70 percent ethanol showed excellent effectiveness against both MRSA and MSSA. All strains except strain 2 were reduced from 10^7/ml to 10^0/ml within one minute. Strain 2 was spoiled perfectly within three minutes. The 10 percent povidone iodine produced a more than 7-log decrease against strains 1 and 2 within one minute. Strains 3 and 4 showed moderate resistance and needed ten minutes to be eradicated. Benzalkonium chloride decreased the viable cell numbers of only strain 3 by 7 orders of magnitude within thirty seconds. Strain 1 also showed high sensitivity. Strains 2 and 4 were moderately resistant to benzalkonium chloride; it took more than ten minutes to eradicate these bacteria. The strains of MSSA tested in the present study were more sensitive than MRSA to benzalkonium chloride. All strains showed tolerance against 0.1 percent chlorhexidine gluconate. Even strain 1, which was the most sensitive to it, had 10^2 surviving cells/ml after being exposed for thirty minutes. Concerning strains 3 and 4, the chlorhexidine gluconate decreased the viable cells only from 10^7 to 10^4 by contact for thirty minutes.

DISCUSSION

We have studied periodical surveys of *S. aureus* in oral cavities of children since 1987, and reported that healthy children can harbor not only *S. aureus* but also MRSA.[8] We regard MRSA as an indigenous bacterium in the oral cavity. Several studies have indicated that *S. aureus* including MRSA can be transmitted by dental treatment.[1,3,12] MRSA, especially, has become an important pathogen causing nosocomial infection even in dental treatment. All strains used in the present study were isolated from children who visited our clinic in 1992. The rate of detection of *S. aureus* among healthy children at that time was 43 percent, and that of MRSA was 13 percent at that time (data not shown). It may not be rare, therefore, to find the children positive for MRSA in dental treatment.

Many kinds of disinfectants are used in dental clinics: ethanol, chlorhexidine gluconate, quaternary ammonium compound (e.g. benzalkonium chloride), povidone iodine, alkaline glutaraldehyde and sodium hypochlorite. Previous studies suggested that alkaline glutaraldehyde and sodium hypochlorite showed good bactericidal activities. Best reported that 0.6 percent sodium hypochlorite and 2 percent alkaline glutaraldehyde were effective in disinfection of not only bacteria, but also viruses and spores on surfaces.[13] Harold also reported that 5.25 percent sodium hypochlorite showed the best result for disinfection of hydrocolloid impressions among eight tested disinfectants. These two disinfectants can be used, however, for instruments or the environment, but not on human hands or fingers.

In the present study, we compared antimicrobial activities of four commercially purchased disinfectants that can be used for hands. The 70 percent ethanol exhibited excellent efficacy for disinfection of all tested strains. Other studies have reported that disinfectants containing high concentrations of ethanol had consistently high antimicrobial activity even in the presence of bioburden.[1,15] Salzman found that 70 percent ethanol was more effective than 1 percent chlorhexidine and was likely to be the safest treatment.[15] It was reported that one minute-exposure of 10 percent povidone iodine produced a 6-log reduction in *S. aureus*. This value is similar to our result with strains 1 and 2. Because the antimicrobial activity of povidone iodine is reportedly reduced in the presence of bioburden, precleaning is more important for povidone iodine than for other disinfectants.[1]

In the case of benzalkonium chloride, there was a significant difference in its effectiveness against MRSA and MSSA. The MRSA strains were more resistant to it than were the MSSA. Several studies reported that some strains of *S. aureus* showed a tolerance to disinfectants, especially quaternary ammonium compound, and resistance to quaternary ammonium compound might be encoded by the *qac* gene on plasmid.[10,11,16] Paulsen revealed that the bacteria receiving the plasmid including the *qac* gene could increase the value of the minimal inhibitory concentration for benzalkonium chloride by four-fold.[10]

The *qac* gene gave multidrug resistance not only to a quaternary ammonium compound, but also to other disinfectants.[17] Although in the present study we observed no difference between MRSA and MSSA in their susceptibilities to the disinfectants, except for benzalkonium chloride, we can deny that the MRSA used in the present study might possess the *qac* gene. When using a quaternary ammonium compound such as benzalkonium chloride for disinfection of MRSA, the contact time should be extended.

All tested strains were resistant to 0.1 percent chlorhexidine gluconate. After the contact with chlorhexidine gluconate for thirty minutes, all strains survived 10^2 to 10^5 cells/ml. Several studies have pointed out that the bactericidal activity of chlorhexidine gluconate was relatively weak. The decrement of microbial load by 1 percent chlorhexidine gluconate-soaked cotton swabs was almost the same as that of saline-soaked cotton swabs.[15] Although some reports stated that chlorhexidine gluconate was effective against MRSA *in vitro*, a number of in-use studies indicated the reverse.[18-22] Chlorhexidine gluconate was not able to reduce microbial numbers effectively in a short time.[15] These results together with our present observations suggest that chlorhexidine gluconate should be avoided for disinfection of hands or fingers.

In conclusion, we showed antimicrobial activities of four disinfectants against clinical isolated *S. aureus*. Ethanol was highly effective in time-course killing tests against both MRSA and MSSA. Chlorhexidine gluconate was the least effective of all. Although our research was conducted in a laboratory with very limited numbers of disinfectants and strains, the results are informative concerning the efficient use of disinfectants in dental clinics.

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OBESITY

Obesity is the most common and costly nutritional problem in the United States, affecting approximately 33 percent of adults. Health care costs directly attributable to obesity amount to approximately $68 billion per year, and an additional $30 billion per year is spent on weight-reduction programs and special foods. Nevertheless, treatment directed toward the long-term reduction of body weight is largely ineffective, and 90 to 95 percent of persons who lose weight subsequently regain it.

The level of energy storage, or fatness, at which the risk of morbidity increases is determined on an actuarial basis. The body-mass index (the weight in kilograms divided by the square of the height in meters) is easy to calculate and is sufficiently correlated with direct measures of body fatness (e.g., as measured by hydrodensitometry) to be useful in defining obesity clinically. A body-mass index greater than 28 is associated with a risk of morbidity, such as stroke, ischemic heart disease, or diabetes mellitus, that is three to four times the risk in the general population. A central distribution of body fat (ratio of waist circumference to hip circumference, >0.90 in women and >1.0 in men) is associated with a higher risk of morbidity and mortality than a more peripheral distribution of body fat (waist:hip ratio, <0.75 in women and <0.85 in men) and may be a better indicator of the risk of morbidity than absolute fat mass. Obesity in childhood appears to increase the risk of subsequent morbidity, whether or not obesity persists into adulthood.

Rosenbaum, M. *et al*: Obesity. N Engl J Med, 337:396-407, August 7, 1997.

Consequences of serious oral injury associated with the congenital analgia syndrome

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Congenital analgia syndrome is characterized by the absence of a sensitivity to subjective pain. Consequently, infants with the disorder suffer severe injuries of the oral cavity and fingers, caused by uncontrolled biting, mechanical trauma and burning. According to Leiber and Olbrich it is in all probability a simple recessive congenital disease.[1]

Findings from the examination of three sisters at the ages of seven months, twelve years and thirteen years are described below. The parents are of north African heritage and distantly related. They have a total of six living children, four afflicted daughters and two symptom-free sons. Another son, deceased early in life, is suspected to have been a symptom carrier also.

EXAMINATION RESULTS

Case 1

A thirteen-year-old girl in good general condition.

The lower third of the face has a noticeably short vertical dimension, as a result of almost complete destruction of the maxillary alveolar process and hard palate. This caused perforation of the meatus nasi inferior, creating an opening to the oral cavity, and allowing the epithelium of the defective areas to be covered by mucus. There are no maxillary teeth remaining and the mandibular anterior teeth are also missing. An advanced stage of atrophy was seen in the space between the mandibular central incisors. The DMF(T) index is 20 (18 missing, 2 decayed).[2]

The radiographic examinations confirm the results: extensive destruction of the hard palate and maxillary alveolar process. The unerupted mandibular third molars are present, and extensive marginal bone loss in the area of the molars and premolars is present.

The photograph of her hands (Figure 1) shows a morphological change of all fingertips, ranging from scarred contraction and only rudimentary fingernails to massive deformity of the distal phalanges of thumb and index finger.

Case 2

A twelve-year-old girl in good general condition.

The oral area is shown in Figure 2. The whole perioral lip area is fissured with scars. They were caused by previous phlegmoid infections, leaving the soft tissue deeply fissured. The redness of the lips is only rudimentary. Traumatic inflammatory events caused osteolysis of the maxillary alveolar process, similar to that found in her older sister. The meatus nasi inferior are wide open and the nasal conchae are visible. This girl also has no maxillary teeth. The mandibular anterior teeth and right first premolar are missing. The remaining tongue tissue is covered with scars. The DMF(T) is 22 (21 missing and 1 decayed tooth).

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Figure 1. Clinical consequences/changes of finger-tips (Case 1, thirteen years old).

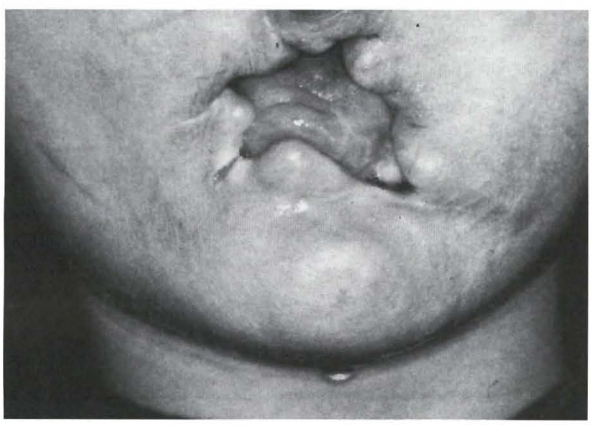

Figure 2. External region of mouth and lips (Case 2, twelve years old).

Figure 3. Radiological results.

The radiographic examination confirms the clinical findings (Figure 3). Additional destructions of the vomer and the mesial margin of the maxillary sinus are also visible.

The photograph of her hands (Figure 4) reveals the severe deformities of all fingers and the scarred contractions as far as the palms of the hands.

Case 3

A seven-month-old girl in good general condition.

Figure 4. Clinical consequences/mutilation of fingers and hands.

Figure 5. Intraoral findings with bite wounds of tongue (Case 3, seven months old).

The perioral tissues and lips are intact. Examination revealed the erupted primary central incisors. The visible injuries, caused by the erupted teeth in about three weeks time, are found on the underside and tip of the tongue (Figure 5). Some of the open sores are necrotic or covered with fibrin. The maxillary alveolar process and the hard palate are still undamaged at this age.

DISCUSSION AND CONCLUSION

Van Ness Dearborn first published in 1932 a report of the congenital analgia-syndrome as "congenital general pure analgesia."[3] Before 1961 there had been forty more cases under the synonym of "congenital universal pain indifference," "analgia congenita" or "congenital general pain indifference."[1,4] Franconi and Ferrazzini proposed the term "congenital analgia" to identify indifference to pain, even though felt.[4] In this condition patients respond indifferently to pain. Patients with congenital analgia show no autonomic-system reactions, such as increased blood pressure, perspiration, pupil dilation as in healthy individuals with the help of the cold-pressure test (CPT), the application of ice to the skin.[1,4,5] Tem-

perature and sensations of the skin are not normal, and according to autopsy reports there are no pathological findings of the thalamus or cerebral cortex. Furthermore, no peripheral disorders have been found, and the cause of the disease remains unknown.[4,6] Nissler and Parnitzke suspect a congenital weakness of the central nervous system, specifically of the primary pain center of the thalamus opticus.[6]

Congenital analgia must be differentiated from the familial dysautonomia (Riley-Day syndrome), Lesch-Nyhan syndrome and from the so called "pain asymbolia." Patients suffering from Lesch-Nyhan syndrome show mental retardation, spastic cerebral palsy, self-mutilation of fingers and lips by biting, among other characteristics. The mode of transmission is x-linked recessive, thus only males are affected.[7] The process of self-mutilation begins at the age of two years, and it appears to be a localized phenomenon with wounds usually occurring at the same site, repeatedly. This phenomenon appears to be a kind of pain fixation.[8] Familial dysautonomia is a congenital autosomal recessive disorder that is common in eastern European Jews, but a few cases in non-Jews have been reported also. The syndrome is characterized by abnormal functioning of the autonomic nervous system, like indifference to pain, diminished lacrimation, poor vasomotor control, aspiration of saliva, difficulty in swallowing and emotional instability, among other signs and characteristics.[9,10] Similar to the CPT in "Riley-Day syndrome," there may not be higher blood pressure, but symptoms such as perspiration and salivation, instability and tendon reflexes do occur.[5,10,11] All physiological vegetative reactions of pain can be proven in patients with "pain asymbolia."[4,5]

Patients with congenital analgia show numerous mechanical traumas and burnings; these injuries have very poor healing capabilities due to infection. Even minor accidents have caused bone fractures. These will often lead to permanent fractures resulting in aseptic bone necrosis and/or osteomyelitis, because of the patient's inability to remain immobile. There is also the possibility of an immunodeficiency.[4,5]

Nissler and Parnitzke suspect a trophic disturbance behind the described skeletal changes, which they consider connected with the patient's reaction to pain.[6]

The destruction of the soft and hard oral tissues seen in the cases of the two older girls, twelve and thirteen years of age, shows that neither family influences or previous medical treatments could have altered the consequences of the congenita analgia. The personal surroundings of the patients were evaluated in discussions with the mother and the pediatrician. At the time of our examination, the children were experiencing additional speech, mastication, and aesthetic limitations. In the case of the older sister it was partly compensated for by a positive attitude; the younger girl is showing, however, previous autoaggressive reactions.

Rehabilitation using a prosthetic device to correct the defect and accommodate projected growth was the objective of the proposed therapy. The treatment could not be provided due to the family situation and the long distance the family needed to travel from home to clinic. According to the pediatrician, the family is presently living in their home country.

It should be mentioned that with parent compliance we would have focused on a prophylactic extraction of the entire primary dentition of the seven-month-old daughter. This would have prevented the problematic consequences due to bite trauma. Franconi and Ferrazzini assume that a potential pain sensation exists in these patients, but maturation and differentiation are retarded. With aging, the analgia could change to provide pain sensation at a low level.[4] Simultaneously there would be an increased development of other qualities like tactal sensation. Additionally knowledge and experience would in part substitute for the normal subjective responses to pain. In the permanent dentition stage, this child would have better control of mastication than did her older sisters.

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Treatment trends during a thirteen-year period in a student pediatric dentistry clinic

Enrique Bimstein, CD
Eliezer Eidelman, D Odont, MSD

Dental schools have the responsibility to prepare dental students for the reality of private practice. The curriculum of dental schools should consider, therefore, trends in the dental needs of the population, as well as advances in dental materials and technology.

In general a trend toward a decrease in the prevalence of dental caries has been identified in several countries.[1] Water fluoridation was implemented in Israel in 1988, and a subsequent decrease in the prevalence of caries in children was reported.[2] On the other hand, the massive immigration in Israel, during the last few years, from Ethiopia and the former URSS, may have influenced the dental needs of the Israeli population.[3]

The decrease in caries prevalence may result in a shortage of patients and/or the impossibility to teach basic procedural techniques. Consequently a negative effect on the student's ability to provide quality care for children after graduation may occur.[4] As soon as 1979, Speicher reported that 53 percent of dental schools indicated patient shortages for teaching purposes.[5] The purpose of the present article was to report, therefore, the treatment trends observed during thirteen years, from 1980 to 1992, in the senior year at the pediatric dentistry clinic, of the Hadassah Faculty of Dental Medicine in Jerusalem, and discuss the implication in clinical teaching.

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MATERIALS AND METHODS

The curriculum of the Hadassah Faculty of Dental Medicine includes six academic years. Pediatric dentistry is taught during the last two years, which include a once-a-week three-hour pediatric dentistry clinic. In the fifth academic year, pediatric dentistry clinic is first devoted to a preclinical mannequin phase in which quality of treatment is emphasized; students are required to complete a specific number of procedures at an acceptable level of performance, before they are allowed to treat children. Since students complete the preclinical stage at their own pace, they are exposed to the treatment of children for different periods of time. On the other hand, during the sixth academic year all students complete the same number of pediatric dentistry clinics. The present study includes, therefore, only the data from the senior year pediatric dentistry clinic, when elementary schoolchildren are treated. It should be noted, however, that since rotations at the different departments are done at the expense of the regular clinics, the number of regular pediatric dentistry clinics during the sixth academic year is reduced to thirty (90 hours).

The student records from the classes 1980 to 1992 were reviewed and the values by years of number of students, patients/student ratio and of the following procedures by student and by patient were recorded:

- ☐ One or ≥2 surface restorations.
- ☐ Pit-and-fissure sealants.
- ☐ Preventive resin restorations.

Table ☐ Patients per student ratio by year.

Year	Patients/Student ratio		
	mean	SD	Range
1980	4.8	1.2	3-8
1981	6.0	1.6	3-10
1982	6.2	1.1	4-8
1983	6.1	1.2	4-9
1984	7.4	1.5	4-11
1985	7.7	1.7	4-12
1986	5.6	1.3	4-9
1987	6.5	1.9	3-11
1988	5.7	1.4	4-10
1989	6.7	2.0	3-12
1990	6.7	1.7	3-12
1991	5.8	1.8	2-10
1992	6.0	2.0	3-10
All	6.3	1.8	

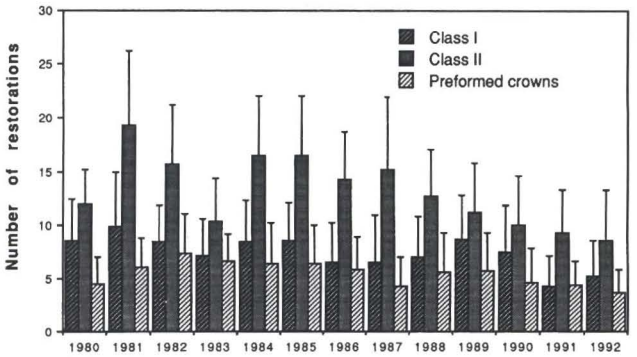

Figure 1. Number of restorations per student by year.

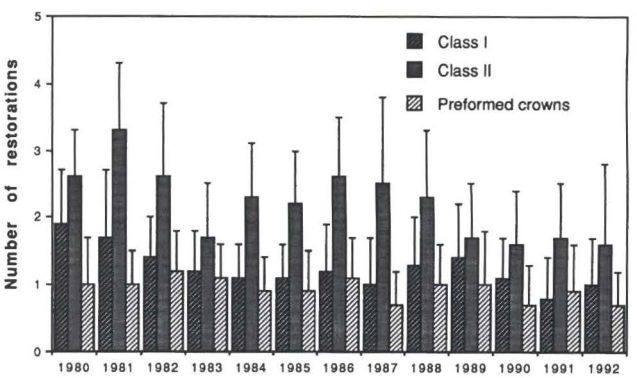

Figure 2. Number of restorations per patient by year.

☐ Fracture restorations.
☐ Pulpotomies.
☐ Pulpectomies.

Space maintainers and extractions were not included since, in addition to those done in the pediatric dentistry clinic, some are performed under the supervision of the orthodontics and surgery departments, respectively. Oral hygiene and fluoride applications were also omitted, since they are given routinely to all children under the supervision of the Department of Community Dentistry.

A standard computer program for statistical analysis (StatView®II, StatView®SE+Graphics, Abacus Concepts, Inc., Berkeley, CA, 1987) was utilized for the statistical examination. Pearson's correlations were utilized to examine the significance of the correlations between year and the different procedures by student and by patient.

RESULTS

The mean number of students per academic year was 40.1 ± 4.9. The patients/student ratio for all the years surveyed was 6.3 ± 1.8, and there was no specific trend of change with time (r=0.06, Table). A significant decrease with time was evident in the amount of one-surface and ≥2 surface restorations by student (r=−0.25 and r=−0.33 respectively) and by patient (r=−0.27 and r=−0.31 respectively) (Figures 1 and 2). During the thirteen-year period, the students performed an average of 7.3 (SD=4.1, range 0-23) one-surface and 12.9 (SD=5.8, range 1-36) two- or >2-surface restorations. On the other hand, no significant change with time in the amount of preformed crowns by student (r=−0.19) or by patient (r=−0.15) was evident (Figures 1 and 2). An average of 5.5 (SD= 3.2, range 0-19) preformed crowns per student was placed.

While there was a significant decrease with time in the number of restorations, a significant increase with time was evident in fissure sealants and preventive resin restorations by student (r=0.41 and r=0.48 respectively) and by patient (r=0.46 and r=0.50 respectively) (Figures 3 and 4). An average of 6.4 (SD= 5.9, range 0-39) pit-and-fissure sealants per student was observed during the thirteen-year period, reaching a maximum in 1990 with an average of 10.5 sealants per student (SD=8.4). On the other hand, no significant change with time in the number of restored fractured teeth by student or by patient (r=0.18 and r=0.17 respectively) was evident.

No significant changes with time in the numbers of pulpotomies and pulpectomies by student (r=0.12 and r=0.18 respectively) or by patient (r=0.07 and r=0.19 respectively) were evident (Figures 5 and 6). For all the years, a mean of 2.4 (SD=1.9, range 0-10) pulpotomies

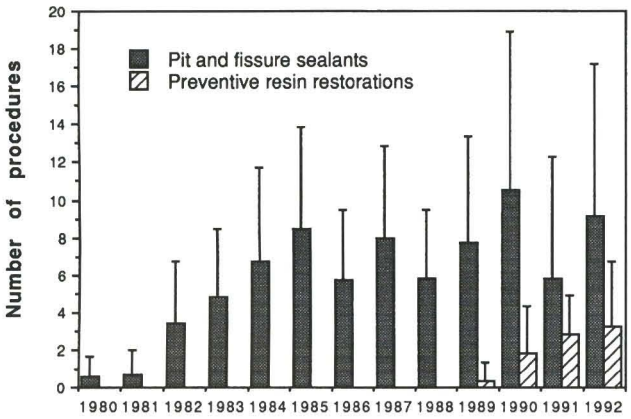

Figure 3. Number of pit-and-fissure sealants and preventive resin restorations per student by year.

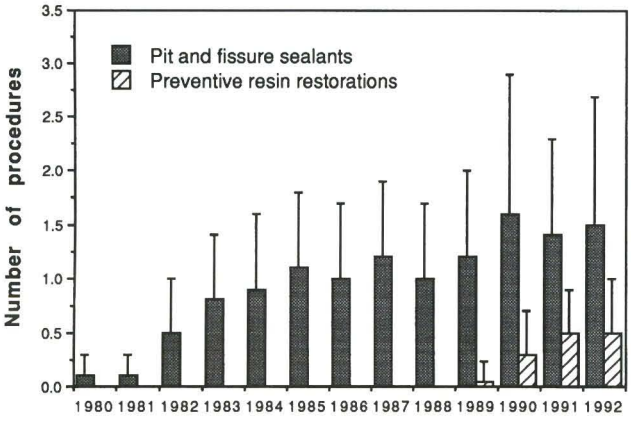

Figure 4. Number of pit-and-fissure sealants and preventive resin restorations per patient by year.

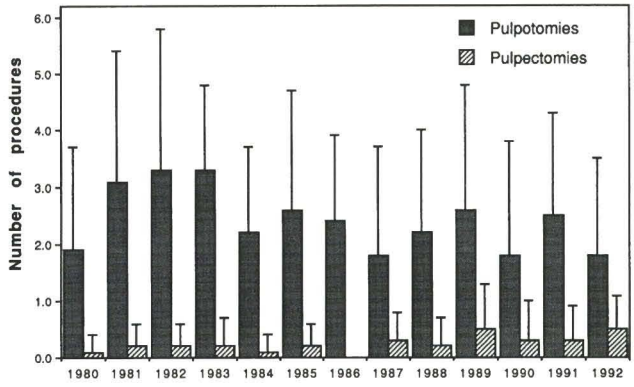

Figure 5. Number of pulp treatments per student by year.

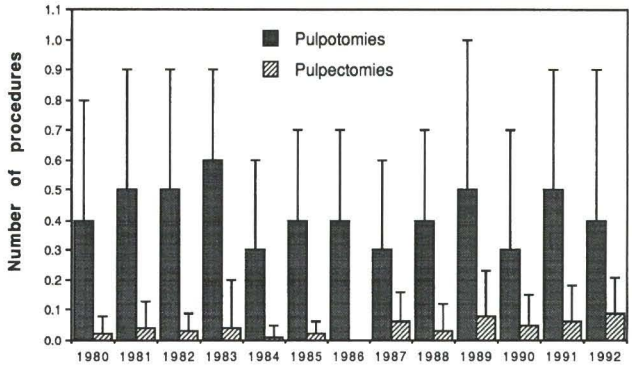

Figure 6. Number of pulp treatments per patient by year.

per student were performed. The total number of treatments by student by year was 44.08 (SD=11.7, range 18-94) and did not change significantly (r=0.03) with time (Figure 7).

Examination of the data by year indicated that: one-surface amalgam restorations were performed by 100 percent of the students in ten academic years and by >96 percent in the other three years; preformed crowns were performed by 100 percent of the students in six years and by ≥93 percent in the other seven years; pulpotomies were performed by 70.7 to 95 percent of the students during the thirteen years of this study; pulpectomies by 7.3 to 42.5 percent of the students; pit-and-fissure sealants were performed by 31.7 percent of the students in 1980, this percentage increasing to 85.4 percent in 1983 and to >96 percent since 1985. A significant trend with time (r=0.60) was evident only in the percentage of students who performed pit-and-fissure sealants.

DISCUSSION

It becomes increasingly important that teachers of pediatric dentistry consider modifications in teaching programs to reflect realistically the changing needs of children, the future demand for services, and the public's well-being.

In addition, the predoctoral pediatric dentistry curriculum has been affected by dental advances in technology and materials, mainly the use of etching techniques and composite materials in pit-and-fissure sealants, preventive resin restorations, and the restoration of fractured

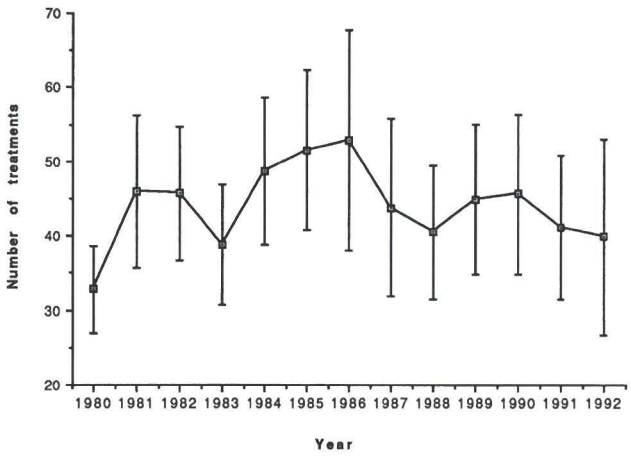

Figure 7. Total number of treatments per student by year.

permanent teeth. Our dental faculty has accepted pit-and-fissure sealants as an integral part of the preventive dentistry protocol for more than ten years. A similar acceptance by the faculty of the superiority of preventive resin restorations over amalgam for treating initial occlusal caries has influenced the trend observed where the number of amalgam restorations decreased and the number of preventive resin restorations increased.

It has been pointed out that the caries prevalence decline is most prominent in children and predoctoral activity in pediatric dentistry clinics has shifted, therefore, from traditional restorative procedures to specific topic areas such as preventive techniques, periodontology, care of infants, premedication, growth and development, and guidance of occlusion.[6,7] In a study by Ripa it was indicated that the number of children treated by students, in the School of Dental Medicine of the State University of New York, increased in a nine-year period (1976-1985) to 30 percent from 24.7 to 32.2. The number of patients treated by students was much higher than the one found in our study. The reasons for this difference could be:

- ☐ The clinic in Stony Brook includes both pediatric dentistry and orthodontic treatments, whereas in our faculty there is a separate department for orthodontics.
- ☐ A higher yield of dental treatment needs by patient in our population.
- ☐ The number of hours of patient care in our department is considerably smaller (90 hours per year).

Ripa also found that the more patients seen the more preventive procedures accomplished.[6] He noted also that there was a decrease to 37 percent of the total number of restorations placed by students. In our population the number of amalgam restorations per student dropped by 33.2 percent from 1980 to 1992. No change in the number of stainless steel crowns and pulpotomies was observed.

Walker *et al* indicated that in the University of Iowa Pediatric Dentistry Clinic, from 1978 to 1983, the number of patients with sealants and resin restorations increased significantly, whereas the number of patients with preformed crowns, pulpotomies, amalgam procedures per patient decreased significantly, reflecting a recognition of the superiority of preventive resin restorations over amalgam in specific situations.[8] Furthermore, similar findings were reported by Spencer *et al* of the University of Missouri-Kansas City School of Dentistry, from 1977 to 1987.[9]

Patient availability has been identified as a concern for dental educators, and the establishment of extramural or satellite clinics has been recommended.[7,9] Posnick in a comparison survey of the 1980 and 1988 predoctoral pediatric dentistry curricula in the United States, however, indicated that while 25 percent of the responding chairpersons reported a decrease in clinical time, 31 percent indicated an increase in clinic time. Bell *et al*, in a study published in 1986, reported five-year treatment trends in the Pediatric Dentistry Clinic of the Medical College of Georgia, School of Dentistry (from 1980 to 1984).[4] They indicated, furthermore, that the number of patients per student did not change, but that the restorative need of pedodontic patients is decreasing in quantity and complexity. Similarly, in the present study, no significant change in the number of patients per student was found, but significant changes in the number of one- and ≥2-surface restorations and sealants were found. It should be also noted that the number of student clinical hours has been unchanged for the thirteen-year period of this survey.

One should consider that the small population of children treated in our clinic does not necessarily reflect national trends; the results of this study confirmed, however, that our senior dental students performed the basic tasks required to treat children in their practices.

CONCLUSIONS

- ☐ No significant change with time in the patients/student ratio was observed.
- ☐ A significant decrease with time was evident in the number of amalgam restorations by student.
- ☐ No significant change with time in the number of preformed crowns and pulp therapies per students was observed.

- ☐ A significant increase with time was noticed in the number of fissure sealants and preventive resin restorations.
- ☐ No significant change with time in the number of pulpotomies and pulpectomies per student were observed.
- ☐ The senior dental students in our faculty perform the basic tasks required to treat children in their practice.

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DETECTION OF ORAL CANCER

For a disease that is dentistry's to prevent and treat, we have demonstrated a singular lack of progress in controlling the occurrence of oral and pharyngeal cancer, especially when compared with the major inroads that have been made in cancers of the prostate, breast and colon.

Consider this abysmal record. Each year, 30,000 U.S. citizens are diagnosed with oral cancer—a number that has shown no meaningful decrease in the last three decades. From the oral cancer morbidity pool, about 8,000 deaths are recorded each year; that is more than one oral cancer death per hour.

While the oral cancer death rate exceeds that registered for either cervical cancer or malignant melanoma, it does not get anywhere close to the national attention directed toward early detection of the latter two.

In a time when health care competition is the new order, in which new territories are being staked out by the medical specialties and subspecialties, the issue of who performs what procedure(s) has taken on new importance. If significant numbers of dental practitioners do not fulfill their responsibility in oral cancer detection, the medical specialties will move quickly to become the oral cancer experts.

Dentists have all the skill and training necessary to prevent, diagnose and manage oral cancer. To abrogate that responsibility would be unconscionable. The message could not be clearer: "Do it or lose it!"

Excerpted from Meskin, L.H.: Do it or lose it (editorial).
JADA, 128:1058-1059, August 1997.

Replantation of avulsed primary anterior teeth: Treatment and limitations

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Horst Kirschner, DDS

The age distribution concerning the incidence of anterior tooth injuries shows that mainly children and adolescents are involved.[1,2] The maxillary incisors are most frequently affected. In addition to the well-known indications for replanting permanent teeth, the temporary retention of avulsed primary teeth by replantation may be indicated also.[3-5] The age-peak for tooth-injury in the primary dentition lies between two and four years.[1,6,7] The total accident rate is stated to be between 11 and 30 percent.[1] The maxillary primary incisors are mostly affected.[7,8] In the case of primary-tooth-trauma, displacement and avulsion occur more frequently than fractures.[6-10] The proportion of avulsions is 7 percent to 13 percent.[6,11] The avulsions in the primary dentition are caused mostly by falling against hard objects, and occasionally by child abuse.[10-12]

The reasons for temporarily retaining the primary anterior teeth until the permanent teeth erupt are related to speech development and to physiological aspects of mastication, as well as for psychological reasons.[13] A further important reason lies in the stimulation of maxillary development by the contact of the tongue with the anterior teeth. About 45 percent of postnatal growth is attained by the age of five years.[14] An unfavorable development of the dental arch may occur in the case of premature loss of primary teeth.[2,3]

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The replantation of the primary incisor requires an intact or, in some cases, a slightly resorbed dental root, depending on the stage of development or age of the child. In addition the tooth socket must be well preserved. As in the case of all replantations careful clinical and radiological examinations are necessary. Furthermore, consideration must be accorded the time of accident, and storage and transport of the avulsed tooth. If stored dry the survival time of cells in the residual periodontal ligament is only about thirty minutes.[3,5,15] If transported in milk, isotonic saline solution or, under optimal conditions in a nutrient containing antibiotics (Dentosafe®, Medice Company, Iserlohn, Germany), the tooth may be stored from several hours to two days and replanted with good chances of success.[13,15-19]

The aim in replanting the anterior teeth in the primary dentition is to retain traumatized teeth practically up to the time of eruption of the permanent tooth. In our experience this objective can be attained, if strict indications are observed and the therapeutic procedure described below is implemented.

MATERIALS AND METHODS

The tooth is held in an extraction forceps and cleaned by rinsing in sterile isotonic saline solution (Figure 1). The blades of the forceps must not touch the root surface, to avoid damaging the periodontal cells. The residual periodontal ligament of the root surface is then kept

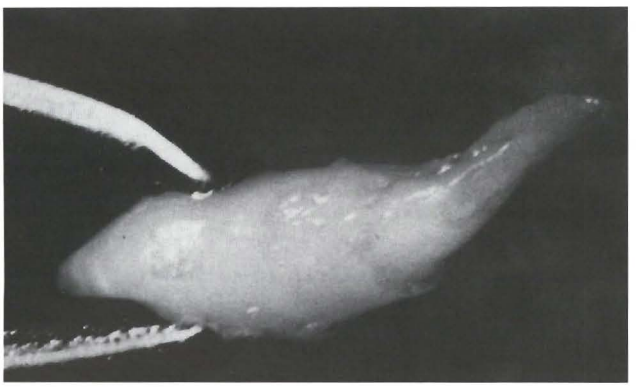

Figure 1. Intraoperative representation of an avulsed primary incisor.

Figure 2. Intraoperative representation after resection of the root apex and retrograde endodontic preparation of the root canal.

Figure 3. Clinical situation after replantation and splinting of teeth 51 and 61. In order to shorten the treatment a postoperative radiograph was not taken.

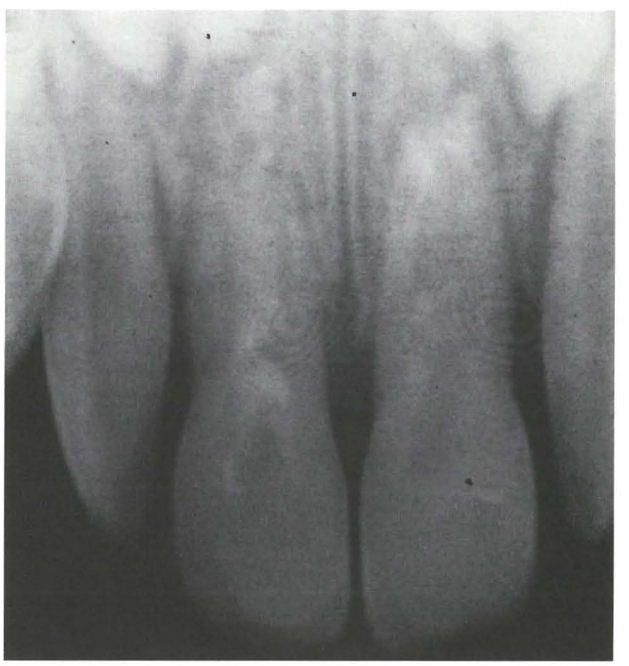

Figure 4. Radiograph of teeth 51 and 61 three months after retrograde spiral root filling with calcium hydroxide (intraoral film). Partial resorption of the filling material.

moist during the entire extraoral treatment. The root apex, about a quarter to one-fifth of the total length of the root, is resected using a saline-cooled diamond disc. The endodontic preparation of the root canal is retrograde using hand instruments. All pulp tissue, including that from the crown pulp, must be carefully removed (Figure 2). Irrigation of the root canal is performed exclusively using sterile saline. After drying the prepared root canal with paper points, the pulp chamber, including the root canal, is filled with a calcium hydroxide preparation with x-ray contrast. Subsequently the tooth is carefully replanted, using local anesthesia, and stabilized for seven to ten days with a splint (Figure 3). Systemic antibiotics for one week are prescribed. Also, the patient is checked for tetanus immunity. This is followed by regular clinical and, if possible, radiological examinations, analogous to the replantation of permanent teeth (Figure 4). For filling the root canals of primary teeth involved in accidents that need replanting, we use Calxyl® and Calxyl® paste syringes (Oco Company, Dirmstein, Germany). The procedure is done mostly retrograde by employing a spiral root filler. Using radiographs this method of application with a spiral root filler has been compared to a retrograde calcium hydroxide

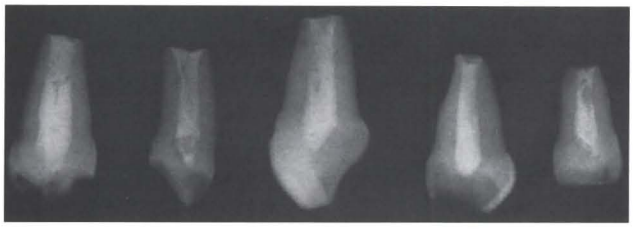

Figure 5. Radiograph of five primary anterior teeth following retrograde injection of calcium hydroxide.

injection in an in vitro test to determine the completeness of the root canal filling.

Five primary maxillary anterior teeth with differently shaped canal lumina were resected according to the method described above and prepared retrograde using hand instruments to at least size 60. At first the root fillings were made using a spiral root filler, followed by radiographic examinations. The filling produced was subsequently completely removed by intensive irrigation. Afterwards, for comparison, fillings of calcium hydroxide were made on the same teeth using retrograde injections followed by radiographic testing. In the case of the injections, the needle was inserted as far as the crown chamber and, while dispensing the preparation, slowly withdrawn from the root canal in a spiral motion. The needles (0.9 × 35 mm) provided by the manufacturer were changed to thinner needles (0.7 × 30 mm) in the investigations, such that an endodontic canal preparation only as large as instrument size 60 was necessary for the injection. Needles thinner than this are not suitable for injecting as they do not allow the calcium hydroxide to pass through.

RESULTS

An in vitro test showed that spiral root filling with calcium hydroxide as well as injecting the preparation with a paste-like consistency into the root canal results in almost complete obturation and complete adaption of the sealer to the canal walls (Figure 5). Injection is the quicker method.

DISCUSSION

Avulsions of primary anterior teeth caused by accidents are relatively frequent. Even though their replantation is occasionally subject to discussion in the literature, replantation may well be indicated, for example, for reasons concerning speech development in two-to-four-year-old children.[3-5,12,20-25]

The posttraumatic treatment of infants and children of preschool age can sometimes be made difficult through defensive behavior. In any case the treatment requires a complete, specific, local anesthesia at the operating site. Sedation by oral administration of diazepam or midazolam may of course be necessary in individual cases before replantation. Narcosis, however, is not indicated.[13] The actual replantation of the teeth represents only a very short period of time in the complete treatment; splinting, however, may require somewhat more time.

In order to prevent any damage to the dental germs of the permanent dentition, it is better to use the replantation method described than a spontaneous replantation followed by endodontic treatment.[12] On the one hand, a contusion or perforation of the dental germ of the second dentition can thus be prevented by generous resection of the root and, on the other hand, a postoperative apical periodontitis may be avoided by careful retrograde endodontic preparation and treatment with a resorbable filling material. Just as in the case of replantation of permanent teeth, the requirement in this case is for an atraumatic, physiological storage and care of the teeth. In addition, care should be taken in achieving a complete retrograde endodontic preparation of the root canal and pulp chamber, together with an adaption of the root canal sealer filling the canal lumen as perfectly as possible. On no account should there be any unprepared and unfilled residual lumina remaining in the root canal.[13] Canal irrigation, as in the case of an orthograde endodontic treatment, is not indicated in the course of endodontic replantation therapy. Solutions such as 3 percent H_2O_2 would permanently damage the cells in the residual periodontal ligament on contact.

A resorbable filling material with good radiographic contrast is employed, in which case calcium hydroxide preparations have been particularly successful on account of their tissue tolerance and antibacterial properties.[26-28] As was demonstrated, an almost completely filled seal is possible in a quick and simple manner by applying Calxyl® using retrograde injection. The combination of spiral root filling and retrograde condensation using paper points appears to us to be a lot more time-consuming and without any greater chances of success.[20]

The endodontic and surgical treatment described for avulsed anterior teeth represents on the whole a technically simple method with good chances of success, if the criteria mentioned are taken into account. Primary

teeth that have been injured in accidents may be kept almost until the normal eruption of the second dentition. In the case of permanent teeth, the dental indication is comparatively easy to establish by making inquiries as to the time of the accident and tooth storage, as well as by clinical and radiological examination of the tooth and socket. In the case, however, of a child involved in an accident, the psychological stress arising from posttraumatic dental treatment and the ability to deal with it varies greatly from child to child and must be taken into consideration. As in all surgical interventions, including the replantation of avulsed primary anterior teeth, the attending physician must consider benefits against the risks. This means that the possible (psychological) injury caused by a surgical intervention (replantation of a primary tooth) must not exceed the possible benefit (retention of the primary anterior teeth almost until the time for the second dentition, including the positive effects already mentioned). Immediate replanting is no longer necessary due to the development of tooth rescue kits (e.g. Dentosafe®). The tooth can be placed in the nutrient and stored for up to forty-eight hours.[18,19] Thus child, parents, and dentist are not rushed into making decisions immediately following the accident, or forced into a further traumatic, and by the same token, difficult treatment. The child has up to forty-eight hours to recover from the accident. After being well informed by the dentist, the parents then have the chance, without hurry, to prepare the child for the replantation. In this way the treatment can proceed with minimum stress for everyone involved.

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Evaluation of mandibular infiltration versus block anesthesia in pediatric dentistry

Aly A.T. Sharaf, BDS, MS, PhD

Pain and the need to control pain is a constant challenge in dentistry. Pain control with local anesthesia is required for many dental procedures. Local anesthesia obtained by careful and accurate injection not only permits comfortable and painless treatment, but also increases the patient's confidence in the dentist.[1]

When restoring primary mandibular molars, the customary injection is a mandibular inferior dental nerve block. Block anesthesia has some disadvantages for children, most of all is the prolonged numbness frequently leading to traumatic lip biting.[2]

Although not widely accepted, infiltration in the mandibular molar region of primary teeth has been suggested as another means of achieving anesthesia.[3] There are advantages to using infiltration anesthesia because it is relatively easy to administer, does not numb the tongue and lips, and offers the possibility of a shorter period of duration; because of the density of mandibular bone, however, anesthesia by infiltration may prove unreliable.[1,4]

The purpose of this study was to compare the clinical effectiveness of mandibular infiltration anesthesia and mandibular block anesthesia for the operative treatment, pulp therapy, and extraction of primary molars, and to measure patients' acceptability of both techniques.

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MATERIALS AND METHODS

Children, ages three to nine years, who required bilateral identical dental treatment on mandibular primary molars were selected for this study. In children above eight years of age, a periapical radiograph was made to make certain that the selected teeth had no more than one-third root resorption. The same operator performed all procedures, when possible without parents present, and was assisted by a trained dental assistant. Teeth on each side of the arch were randomly selected, to receive either block or infiltration anesthesia. The side receiving infiltration was treated first and the other side was treated within seventy-two hours. Bilateral identical procedures were performed on each patient: amalgam restorations, pulpotomies and extractions. A rubber dam was used for all restorative procedures and pulpotomies.

INJECTION TECHNIQUES

For both the mandibular block and infiltration techniques a short 27 gauge needle was used to inject mepacaine HCL 2 percent. Topical anesthetic was applied before injection in both techniques and treatment was begun ten minutes after injection.

For the mandibular block the standard technique was used to anesthetize the inferior alveolar and lingual nerves. In the infiltration technique half the carpule was placed in the bottom of the sulcus between the roots of the tooth being treated, and after five minutes two drops of the anesthetic were placed in the mesial and distal

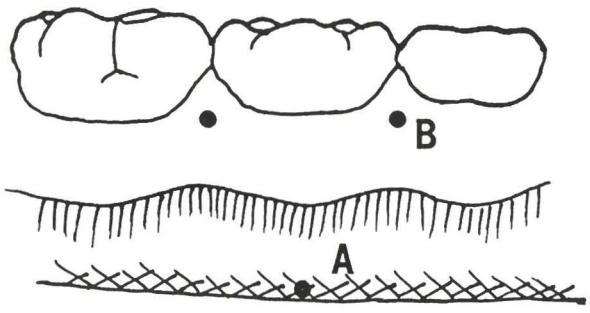

Figure 1. Buccal infiltration anesthesia A) at bottom of sulcus between roots of the treated tooth B) in mesial and distal papillae.

papillae of the primary tooth to be treated, until blanching of the lingual tissue was observed (Figure 1).

Patients distribution

Table 1 summarizes distribution of patients. A total of eighty patients receiving identical bilateral treatment were classified according to age: Group I, twenty-five patients ages three to five years (full primary dentition); group II, twenty-five patients ages five to seven years (around time of eruption of the first permanent molar); and group III, thirty patients, seven to nine years of age (early mixed dentition).

Each group was classified further according to type of treatment and tooth treated: In both groups I and II, the mandibular second primary molar was not extracted. A nonvital pulpotomy was performed instead.

MEASURING PAIN REACTION

The sounds, eyes and motor scale (SEM) (Table 2) was used together with the Frankl behavior classification

Table 1 ☐ Distribution of patients and type of treatment.

Group	Extraction		Restorations		Pulpotomy	
	1st 1ry molar	2nd 1ry molar	1st 1ry molar	2nd 1ry molar	1st 1ry molar	2nd 1ry molar
I. 3–5Y n=25	5	—	5	5	5	5
II. 5–7Y n=25	5	—	5	5	5	5
III. 7–9Y n=30	5	5	5	5	5	5

(Table 3) to measure reaction to pain.[5] All patients were cooperative at the beginning of treatment. Pain reaction and behavior were recorded in the following steps:

- ☐ Injection.
- ☐ Rubber dam placement.
- ☐ Entering dentin.
- ☐ Entering the pulp (only in pulpotomy cases).

In extraction cases pain reaction and behavior were recorded in the following steps:

- ☐ Injection.
- ☐ Forceps placement.
- ☐ Final movement.

Measuring patients' responses to either injection technique and determining which type was preferred was done using the Eland color scale.[6,7] A sample of twenty patients ages six to nine years with normal intelligence, and requiring bilateral dental work were selected. In this sample the effectiveness of anesthesia was not measured; only the patient's response to injection was recorded.

Each patient was questioned about things that hurt them in the past. These responses were coordinated with four colors of their choice, representing severe, moderate, mild, and no pain. The following procedure was conducted:

- ☐ Eight squares (yellow, orange, red, green, blue, purple, brown and black) were placed in a row on

Table 2 ☐ The SEM scale used to measure comfort or pain.

Observations	1. Comfort	2. Mild discomfort	3. Moderately painful	4. Painful
Sounds	No sounds indicating pain	Nonspecific sounds; possible pain indication	Specific verbal complaints, e.g., "OW", raises voice	Verbal complaint indicates intense pain, e.g., scream, sobbing
Eyes	No eye signs of discomfort	Eyes wide, show of concern, no tears	Watery eyes, eyes flinching	Crying, tears running down face
Motor	Hands relaxed; no apparent body tenseness	Hands show some distress or tension; grasps chair due to discomfort, muscular tension	Random movement of arms or body without aggressive intention of physical contact, grimace, twitch	Movement of hands to make aggressive physical contact, e.g., punching, pulling head away

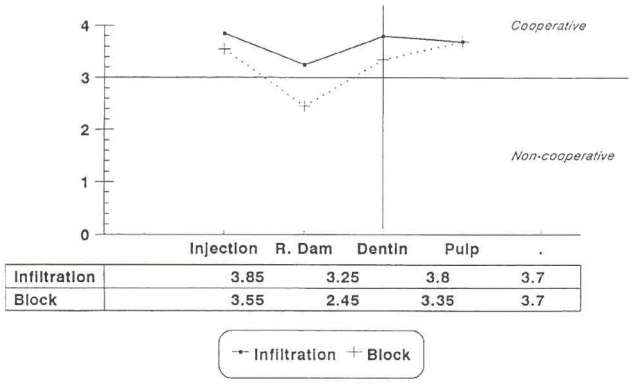

Figure 2a. Behavior during restorations and pulpotomy (3–5 years old).

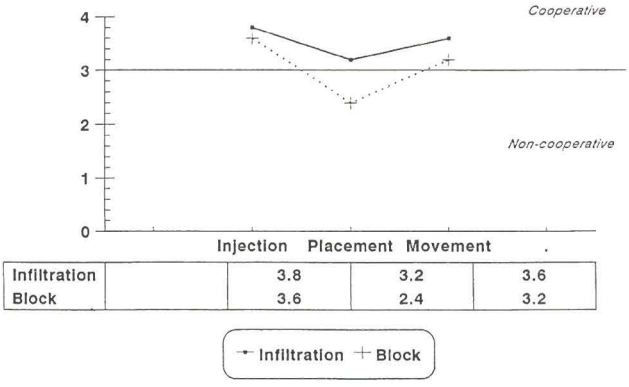

Figure 2b. Behavior during extractions (3–5 years old).

a white background and presented to each child in the same order.

- ☐ The child was asked, "Of these colors which is like... ?" (The event identified by the child as hurting the most). That color square was placed on the board away from other colors (it represented severe pain and given a numerical value of 3).
- ☐ The child was asked the same question for the events identified by him as moderate, mild, and no pain, and the corresponding color squares were placed below the color square representing severe pain and given numerical values of 2, 1 and 0, respectively.

Each child first received infiltration anesthesia on one side and inferior alveolar nerve block on the other side at the same visit, using the techniques previously mentioned. After each injection the child was asked to choose the color representing how he felt.

Statistical analysis was then performed using the paired t-test.

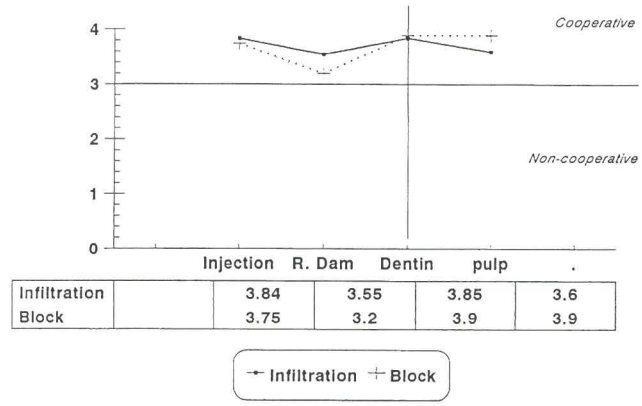

Figure 3a. Behavior during restorations and pulpotomy (5–7 years old).

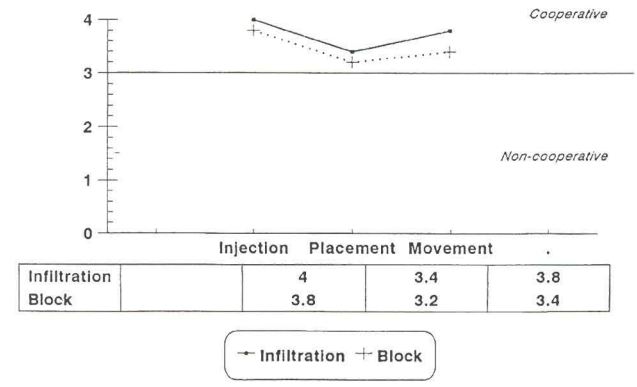

Figure 3b. Behavior during extractions (5–7 years old).

RESULTS

Table 4 shows a significant difference in injection pain between the two techniques. This was also confirmed by the Eland color scale test (Table 5).

Tables 6 and 7 describe the behavior and pain reaction in the step following injection, namely, placing the rubber dam or placing the forceps beaks around the tooth. Still the SEM scores were better for infiltration anesthesia. But, also by viewing behavior scores, it was noticed that behavior deteriorated, especially in patients receiving block anesthesia, which in most cases was significantly different from the behavior deterioration observed in patients receiving infiltration anesthesia. Table 8 summarizes behavior and pain reaction, however, during entrance to the dentin. Behavior improved and SEM scores showed no significant differences, except in children ages three to five years, where behavior was also significantly different. Table 9 summarizes the pain re-

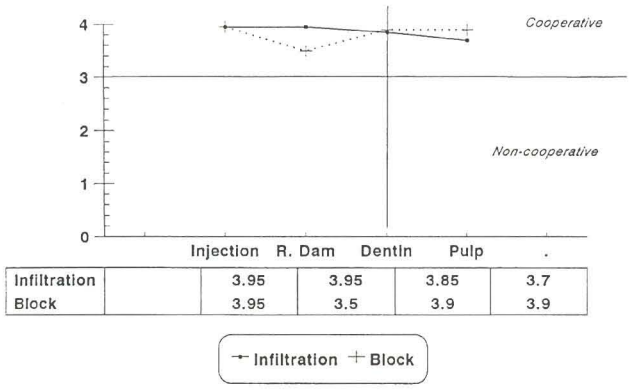

Figure 4a. Behavior during restorations and pulpotomy (7–9 years old).

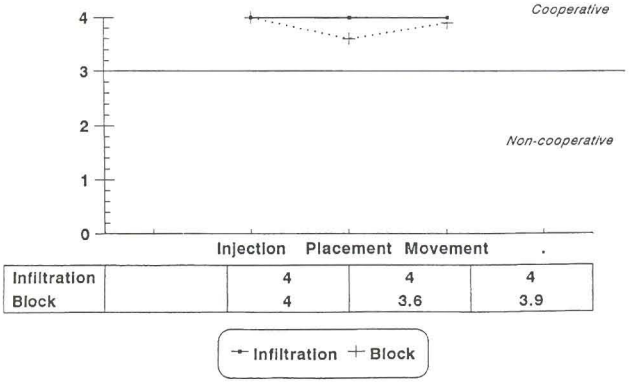

Figure 4b. Behavior during extractions (7–9 years old).

action and the behavior during the final movement of tooth extraction. There were no significant differences in the two techniques, in most cases.

Table 10 shows no significant differences between the techniques in both behavior and pain reaction upon entering the pulp in mandibular first primary molars, regardless of age. When second primary molars were pulpally treated, however, some failures occurred with infiltration anesthesia (Table 11).

The pattern of behavioral changes at each study step is represented in Figures 2, 3 and 4, for each age-group separately.

It was noticed that deterioration of behavior occurred after receiving the injection. Behavior deterioration was more pronounced in younger patients and in patients receiving block anesthesia.

In three to five-year-old patients behavior turned negative in some cases following nerve block injection.

Table 3 ☐ Frankl Behavioral Scale (Frankl *et al* 1962) used to measure cooperative behavior.

Rating 1:	Definitely negative Refusal of treatment, crying forcefully, fearful, or any other overt evidence of extreme negativism
Rating 2:	Negative Reluctant to accept treatment, uncooperative, some evidence of negative attitude but not pronounced (i.e., sullen, withdrawn)
Rating 3:	Positive Acceptance of treatment, at times cautious; willingness to comply with the dentist, at times with reservation, but patient follows the dentist's directions cooperatively
Rating 4:	Definitely positive Good rapport with the dentist interested in the dental procedures, laughing and enjoying

Table 4 ☐ Pain reaction during injection of the needle using SEM scale.

	Infiltration	Block	Significance
3–5Y n=25	1.32 ±0.39	2.36 ±0.68	P=0.000(S)
5–7Y n=25	1.24 ±0.354	2.013 ±0.773	P=0.000(S)
7–9Y n=30	1.11 ±0.22	1.96 ±0.572	P=0.000(S)

S = Significant

Table 5 ☐ Pain perception using the Eland color scale (n=20).

Infiltration		Block
1.1 ± 0.97	P = 0.000 (S)	2.5 ± 0.61

S = Significant

Table 6 ☐ Behavior and pain reaction during rubber dam placement.

		Behavior		SEM	
Age group	Tooth	Infiltration	Block	Infiltration	Block
3–5Y	D	3.2±0.42	2.4±0.52	1.00	1.97±0.62
	n=10	P = 0.000 S		P = 0.003 S	
	E	3.3±0.48	2.5±0.71	1.2±0.32	1.87±0.53
n=20	n=10	P = 0.003 S		P = 0.002 S	
5–7Y	D	3.6±0.52	3.2±0.42	1.1±0.16	1.53±0.42
	n=10	P = 0.037 S		P = 0.002 S	
	E	3.5±0.53	3.2±0.63	1.16±0.47	1.53±0.5
n=20	n=10	P = 0.081 NS		P = 0.007 S	
7–9Y	D	4	3.6±0.52	1.00	1.3±0.37
	n=10	P = 0.037 S		P = 0.029 S	
	E	3.9±0.32	3.4±0.52	1.03±0.11	1.47±0.36
n=20	n=10	P = 0.015 S		P = 0.002 S	

S = Significant
NS = Nonsignificant
D = 1st primary molar
E = 2nd primary molar

Negative behavior was not reported following infiltration injection and in older age-groups. Behavior improved to the levels reported at the start of the study. In pulpotomy cases, however, where failure of infiltra-

Table 7 ☐ Behavior and pain reaction during placement of extraction forceps.

		Behavior		SEM	
Age-group	Tooth	Infiltration	Block	Infiltration	Block
3–5Y	D	3.2±0.45	2.4±0.55	1.4±0.28	2.2±0.77
n=5	n=5	P = 0.016 S		P = 0.09 NS	
5–7Y	D	3.4±0.55	3.2±0.45	1.33±0.24	1.47±0.3
n=5	n=5	P = 0.374 NS		P = 0.178 NS	
7–9Y	D	4	3.6±0.55	1.2±0.3	1.27±0.28
	n=5	P = 0.178 NS		P = 0.374 NS	
n = 10	E	4	3.6±0.55	1.2±0.3	1.6±0.37
	n=5	P = 0.178 NS		P = 0.07 NS	

S = Significant
NS = Nonsignificant
D = 1st primary molar
E = 2nd primary molar

Table 8 ☐ Behavior and pain reaction during entering dentin.

		Behavior		SEM	
Age-group	Tooth	Infiltration	Block	Infiltration	Block
3–5Y	D	3.9±0.32	3.2±0.42	1.00	1.33±0.42
	n = 10	P = 0.001 S		P = 0.032 S	
	E	3.7±0.48	3.5±0.53	1.2±0.32	1.43±0.52
n=20	n=10	P = 0.443 NS		P = 0.257 NS	
5–7Y	D	4	4	1	1
	n=10				
	E	3.74±0.67	3.8±0.42	1.16±0.47	1.53±0.5
n=20	n=10	P = 0.591 NS		P = 0.081 NS	
7–9Y	D	4	4	1	1
	n=10				
	E	3.7±0.48	3.8±0.42	1.17±0.36	1
n=20	n=10	P = 0.343 NS		P = 0.177 NS	

S = Significant
NS = Nonsignificant
D = 1st primary molar
E = 2nd primary molar

Table 9 ☐ Behavior and pain reaction during tooth movement in extractions.

		Behavior		SEM	
Age-group	Tooth	Infiltration	Block	Infiltration	Block
3–5Y	D	3.6±0.55	3.2±0.45	1.27±0.37	1.73±0.28
n=5	n=5	P = 0.178 NS		P = 0.108 NS	
5–7Y	D	3.8±0.45	3.4±0.55	1.13±0.18	1.47±0.3
n=5	n=5	P = 0.374 NS		P = 0.034 NS	
7–9Y	D	4	4	1.13±0.18	1.27±0.28
	n=5			P = 0.178 NS	
n=10	E	4	3.8±0.45	1.13±0.18	1.33±0.41
	n=5	P = 0.374 NS		P = 0.374 NS	

NS = Nonsignificant
D = 1st primary molar
E = 2nd primary molar

Table 10 ☐ Behavior and pain reaction upon entering the pulp in mandibular first primary molars.

	Behavior		SEM	
Age-group	Infiltration	Block	Infiltration	Block
3–5Y	4	3.6±0.55	1	1.067±0.15
(n=5)	P = 0.178 NS		P = 0.374 NS	
5–7Y	4	4	1	1
(n=5)				
7–9Y	4	4	1	1
(n=5)				

NS = Nonsignificant

Table 11 ☐ Incidence of failure of infiltration anesthesia upon entering the pulp in mandibular second primary molars.

3–5Y (n=5)	5–7Y (n=5)	7–9Y (n=5)
(2/5) = 40%	(3/5) = 60%	(3/5) = 60%

tion anesthesia occurred, behavior showed some deterioration.

It was also noticed that behavior levels in infiltration anesthesia were higher than those in block anesthesia, as patients increased in age. The behavior curves did not show wide variations and became more or less straight.

DISCUSSION

The SEM scale used in our present study proved to be a reasonable and valid scale to measure comfort or pain in children, which agrees with Wright *et al.*[2]

The use of mandibular infiltration anesthesia in children has been recommended by Donohue *et al* and Garcia-Godoy, and Dudkiewicz *et al* in different clinical situations, including restorations, crown placement, pulp treatment, and extractions.[8-10] Our present study showed, however, that mandibular infiltration anesthesia is reliable in obtaining good anesthesia for restorative work; and when accompanied by interpapillary infiltration, extractions can be performed. On the other hand, the effectiveness of infiltration anesthesia in pulp treatment can be questioned.

Wright *et al* concluded that the quality of anesthesia was not related to the position of the tooth; in our present study, however, infiltration anesthesia failed occasionally to provide adequate anesthesia for pulp treatment in mandibular second primary molars.[2] McCallum, McDonald, and Wright came to conclusions similar to ours in earlier studies.[3,4,11] The failure could be attributed to the thickness of the cortical bone.[12] Infiltration anesthesia for pulp therapy in first primary molars, however, was successful regardless of age. The effectiveness in the latter cases could be related to the thickness of cortical bone or to proximity to the mental foramen.[8] Wright *et al* supported the statement that the quality of anesthesia was not affected by age of the patient.[2]

In the present study the type of anesthetic was not studied; Malamed showed that anesthetic agents varied

in potency and penetration.[13] The subject should be investigated further.

Block anesthesia was significantly more painful than infiltration anesthesia as shown by the SEM scale and the Eland color scale. Jones *et al* came to the same conclusion.[14] The interpapillary injection was painful in some cases. The latter could be omitted in cases where anesthetization of the lingual mucosa was not required.

Following injection behavioral changes occurred during placement of the rubber dam or placement of the beaks of the forceps on the tooth. These changes were greater in patients who received block injections, leaving us to conclude that block anesthesia was more painful than infiltration. In younger patients (three to five years of age), the behavior became strongly negative in some patients when block anesthesia was used. For these patients SEM scores showed infiltration anesthesia to be significantly more effective. The comparative difference in results could be attributed to anxiety, fear, or other evidence of emotional distress rather than actual pain. It is well established that anxiety levels can influence the perception of pain (Levit, Talbot, and Pawlicki).[15-17] This postulate was confirmed by the behavioral improvement shown on the SEM scale when anxiety was relieved.

The behavior curves of children receiving infiltration anesthesia were better than when they received block anesthesia, beginning with the first visit. Each child had infiltration anesthesia at the first visit for all operative procedures, and had block anesthesia at the second visit. Again it was observed that behavior in younger patients is variable and sometimes changes dramatically, while as patients grew older the behavioral curve became straighter, perhaps attributable to better understanding and behavioral control. The authors concluded that children with good behavior from the start score better on the SEM scale, which agreed with the finding of Wright *et al*.[2]

CONCLUSIONS

- ☐ Buccal infiltration anesthesia is effective in providing good anesthesia for restorative work and for extractions, when supplemented by interpapillary injections in mandibular primary molars regardless of age.
- ☐ Buccal infiltration anesthesia is effective in providing good anesthesia for pulp treatment in mandibular first primary molars regardless of age.
- ☐ Buccal infiltration anesthesia is not reliable in obtaining profound anesthesia for pulp treatment of mandibular second primary molars.
- ☐ Block anesthesia can change negatively the behavior of children ages three to five years and is significantly more painful than buccal infiltration anesthesia.

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DEMOGRAPHICS

Child poverty vs Medicare and Social Security

H. Barry Waldman, BA, DDS, MPH, PhD

"In the United States, distinguished by its extraordinary wealth, there are six million poor individuals known to few others but their own families. They cannot vote, they cannot work, most do not even go to school. They are America's youngest poor—children under age six."[1]

It would be difficult to read any newspaper since the summer of 1996 without coming across an article or two regarding the changes and potential problems associated with the new federal welfare legislation. A previous presentation in the *Journal of Dentistry for Children* provided a general overview of the legislation and the potential impact on children.[2] A basic concern considered in that review could be summed up with the question, "Will this new welfare system ensure the safety and well-being of children?"[2]

Now that the welfare problem has been "solved", the Congress and President increasingly are considering the future financial viability of the Medicare program and the general Social Security system. At issue is the necessity of ensuring the availability of both systems for the "baby-boomers", an "avalanche" of whom will be approaching their eligibility for these programs in the early years of the next century.

The potential dire economic consequences of not developing viable long-term solutions for these programs for the older populations cannot be overstated. Yet as the federal government turns its attention to the complex political and fiscal "mine fields" involved in the Medicare and Social Security entitlement programs, including "tinkering" with the Consumer Price Index (CPI), I must ask the question, "Will the increasing concern for the older population overshadow our interests in children,* particularly poor children (14.7 million or 20.8 percent of all children[3])?" Note: these data do not include the almost one million children who receive Supplemental Security Income (SSI) disability benefits and as well as the numbers of other children covered under various other government agency programs.**

The following presentation will consider the economic status of children and the elderly for 1995 (the last calendar year before we "fixed welfare" by "changing welfare as we know it"). The emphasis will be on the impact that "traditional safety net" federal and state support programs were having on the fiscal well-being of the different population age-groups. The review will consider

- ☐ The economics of different age groups.
- ☐ The effects of the government support programs—including, nonmeans-tested transfer government programs (e.g. Social Security, and unemployment compensation), government education assistance (Pell Grants) and means-tested programs (e.g. Aid to Families with Dependent Children [AFDC] and Supplemental Security Income Programs [SSI]).

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*See a previous presentation in the *Journal of Dentistry for Children*, "Are the unmet needs of children overshadowed by our concern for the aged?" for an earlier consideration of this question.[3]

**See a previous review in the *Journal of Dentistry for Children* for further details of the welfare legislation and the numbers of children involved in other "safety net programs".[1]

Table 1 ☐ Persons below the poverty level by race and Hispanic origin: selected years 1960-1995.[4]

	White		African-American		Hispanic*		Asian-American		Totals	
Year	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent
1995	24.4	11.2%	9.9	29.3%	8.6	30.3%	1.4	14.6%	36.4	13.8%
1990	22.3	10.7	9.8	31.9	6.0	28.1	.8	12.2	33.6	13.5
1985	22.8	11.4	8.9	31.3	5.2	29.0	1.0***	16.12***	33.1	14.0
1980	19.7	10.2	8.6	32.5	3.5	25.7			29.3	13.0
1975	17.8	9.7	7.5	31.3	3.0	26.9			25.9	12.5
1970	17.5	9.9	2.5	33.5	2.4**	22.8**			25.4	12.6
1965	22.5	13.3	8.9#	41.8#					33.2	17.3
1960	28.3	17.8	9.9##	55.1##					39.5	22.4

Note: Number in millions.
Totals differ due to rounding.
*May be of any race.
**1972 data.
***1987 data.
#1966 data.
##1959 data.

OVERALL POVERTY LEVELS

In 1995, there were 36.4 million persons (13.8 percent of the population), including more than one in five children living below the poverty level.† While the actual number of persons living in poverty generally has increased since 1980 (reflecting primarily the general increase in the population) the percent of the population living below the poverty level has fluctuated within a limited range since the late 1960s. The most significant decreases, both in the total number of persons and percent of the overall population (including white and African-American component population groups) living below the poverty level, occurred after the introduction of the Medicaid and Medicare programs in 1966. Note: the Bureau of the Census did not report comparable information for some minority population groups (e.g. Hispanics) before the early 1970s, and for other (e.g. Asian-Americans) until the mid-1980s. Data that are available do indicate consistently significant greater poverty rates among minority population groups than non-minority populations (Table 1).

Since the mid-1970s, available information by age, race and ethnicity indicate:

- ☐ A continuing decrease in the proportion of 65 and over white, African-American, Hispanic (may be of any race) and Asian-American populations living in poverty.
- ☐ Limited changes in the proportion of children (less than 18 years) living in poverty.

In 1995, compared to their senior citizen counterparts, the proportion of children living in poverty was significantly greater.

- ☐ White children: 8.9 million (16.2 percent) lived in poverty, compared to 2.6 million (9.0 percent) 65+ white adults.
- ☐ African-American children: 4.8 million (41.9 percent) lived in poverty, compared to 2.4 million (25.4 percent) 65+ African-American adults.
- ☐ Hispanic children: 4.1 million (40.0 percent) lived in poverty, compared to .3 million (23.5 percent) 65+ Hispanic adults.
- ☐ Asian-American children: .6 million (19.5 percent) lived in poverty, compared to <.1 million 65+ Asian-American adults (Table 2).

POOR FAMILIES

In 1995, almost six million families (16.3 percent of all families with children) lived in poverty, with a progressive increase in the percent of families living in poverty reported for families with greater number of children in the family—increasing from 12 percent of families with one child to 57 percent of families with six or more children (Table 3).

Note: the poverty threshold varies by the number and age of persons in a family, e.g. increasing from $10,465 for a family of two (including one child and a householder 65 plus years of age) to $21,911 for a family of seven persons (including six children and one householder) (Table 4).

- ☐ 7.5 percent of married couple families with children (1.9 million families) lived below the poverty level, compared to 41.5 percent of female householder families with no husband present (3.6 million families).
- ☐ The proportion of families with children living in poverty was far greater among minorities than non-minorities (Table 5).

†Unless otherwise stated, all data for this report are from the extensive 1996 Bureau of Census report on US poverty.[4]

Table 2 ☐ Percent of population below poverty level by age, race and Hispanic origin: 1975, 1985, 1995.[4]

	1975	1985	1995
Less than 18 years			
White	12.7%	16.2%	16.2
African-American	41.7%	43.6	41.9
Hispanic*	na	40.3	40.0
Asian-American	na	17.6**	19.5
18-64 years			
White	7.5	9.5	9.6
African-American	23.1	24.3	22.5
Hispanic*	na	22.6	24.9
Asian-American	na	9.6	12.4
65+ years			
White	13.4	11.0	9.0
African-American	36.3	31.5	25.4
Hispanic*	32.6	23.9	23.5
Asian-American	na	15.0**	14.3

*May be of any race.
**1987 data.

Table 3 ☐ Poor families by number of related children in family: 1995.[4]

	Familes below poverty level	
Number of children	Number	Percent of all families
	(in 000s)	
1	1,868	12.4%
2	1,892	13.6
3	1,264	23.7
4	586	36.2
5	233	43.3
6+	131	57.2
All families with children	5,976	16.3%

Note: totals differ due to rounding.

Table 4 ☐ Poverty thresholds in 1995 by size of family and number of children: 1995.[4]

	Number of related children under 18					
Size of family unit	One	Two	Three	Four	Five	Six
Two persons						
Householder <65	$10,504					
65+	10,465					
Three persons	12,267	$12,278				
Four persons	15,976	15,455	$15,509			
Five persons	19,232	18,643	18,187	$17,909		
Six persons	21,890	21,439	21,006	20,364	$19,983	
Seven persons	25,244	24,704	24,328	223,627	22,809	$21,911

Table 5 ☐ Poverty status of families by type of family with related children, race, and Hispanic origin: 1960-1995.[4]

	Percent of all families in category					
	Married couple families			Female householder, no husband present		
	White	African-American	Hispanic*	White	African-American	Hispanic*
1995	7.0%	9.9%	22.6%	35.6%	53.2%	57.3%
1990	7.1	14.3	20.8	37.9	56.1	58.2
1985	8.2	12.9	na	38.7	58.9	64.0
1980	6.8	15.5	na	35.9	56.0	57.3**
1975	6.3	16.5	na	37.3	57.5	na

*May be of any race.
**1979 datum.

Table 6 ☐ Ratio of family income to poverty level for persons by age: 1995.[4]

	Less than 0.50		Under 1.00		Under 1.25	
Age	Number	Percent of total	Number	Percent of total	Number	Percent of total
Under 18	5.9	8.5%	14.7	20.8%	18.6	26.4%
18-24	1.9	7.9	4.5	18.3	5.8	23.4
25-34	2.2	5.3	5.2	12.7	6.9	16.8
35-44	1.5	3.4	4.1	9.4	5.6	13.0
45-54	.9	3.0	2.5	7.8	3.3	10.5
55-59	.4	3.9	1.2	10.3	1.6	13.8
60-64	.3	3.4	1.0	10.2	1.4	14.5
65+	.6	1.9	3.3	10.5	5.6	17.7
Totals	13.9	5.3%	36.4	13.8%	48.8	18.5%

Note: 1.00 = poverty level.
All numbers are in millions.

Table 7 ☐ Children by race, ethnicity and ratio of household income to poverty level: 1995.[4]

	Ratio of poverty level					
	Number (in millions)			Percent of all children		
	Under .50	Under 1.00	Under 2.00	Under .50	Under 1.00	Under 2.00
Race & ethnicity						
White	3.3	8.9	21.1	6.0%	16.2%	38.0%
African-American	2.3	4.8	7.7	20.6	41.9	68.1
Hispanic*	1.7	4.1	7.4	16.3	40.0	72.9

Note: 1.00 = poverty level.
*May be of any race.

☐ Compared to all other age-groups, both numerically and proportionately, more youngsters lived in families with incomes
- ☐ Less than half the poverty level.
- ☐ Less than the poverty level.
- ☐ Less than 1.25 times the poverty level.

Almost ten times more children than senior citizens lived in families with incomes less than half the poverty level (Table 6).

☐ 3.3 million white children, 2.3 million African-American children and 1.7 million Hispanic children live in families below the poverty level (Table 7). It is estimated that the new welfare legislation "...will *increase* (sic) the total number of children in poverty by 1.1 million.

☐ 14.4 percent of children living in central cities of metropolitan areas and 8.6 percent of children living in nonmetropolitan areas live in families with

Table 8 ☐ Households by residence and ratio of income to poverty level: 1995.[4]

	Ratio of poverty level					
	Number (in millions)			Percent of all children		
	Under .50	Under 1.00	Under 2.00	Under .50	Under 1.00	Under 2.00
Metropolitan areas						
Central city	3.0	6.8	11.8	14.4	32.8	56.7
Not central city	1.7	4.7	11.3	4.9	13.1	31.8
Nonmetro. area	1.2	3.2	7.4	8.6	22.4	52.5
Region						
Northeast	1.1	2.5	5.0	8.6	19.0	38.2
Midwest	1.1	2.8	6.2	6.6	16.9	36.9
South	2.5	5.7	11.7	10.1	23.5	48.4
West	1.3	3.7	7.6	7.8	22.1	46.1

Note: 1.00 = poverty level.

incomes below the poverty level. A greater proportion of children in the Southern Region of the nation live in poverty than children in other Regions (Table 8).

Between 1979 and 1994, the poverty rate for young children grew twice as fast among whites as among African-Americans and Hispanics. The poverty rate for young white children in the U.S. ". . .is substantially higher than that for children in other Western democracies."[1]

GOVERNMENT SAFETY-NET PROGRAMS

The official definition for poverty is based on pretax money income, excluding capital gains funds. Based on this definition, in 1995, there were 36.4 million persons (13.8 percent of the population) living in poverty. But there are a wide variety of government agency programs that make impact on and modify poverty rates. For example, the addition of the value of Medicare, means-tested noncash transfers (food stamps, housing and Medicaid) and cash transfers (including Supplemental Security Insurance, Social Security and Aid to Families with Dependent Children) reduced the number of persons living below the defined poverty levels by almost 10 million.

Value of support programs

In 1996, the maximum cash assistance program for a family of three within the forty-eight contiguous states ranged from $120 per month in Mississippi to $703 per month in Suffolk County, New York. In the state with the median level of cash assistance, the maximum welfare payment for a three-person family was $389 per month, up from $184 in 1970. But after adjustment for inflation, the purchasing power of the typical relief check in 1996, had declined by 51 percent. The decline was 43 percent in Connecticut, 47 percent in Massachusetts and Michigan, 48 percent in New York City, 59 percent in Illinois, 60 percent in Pennsylvania, 65 percent in New Jersey, and 68 percent in Texas.[5]

Children vs senior citizens

"Elderly people typically get back much more in Medicare benefits than they contribute in payroll taxes and premiums during their lifetimes."‡[5]

Between 1979 and 1994 the number of children under the age of six who lived in poverty grew from 3.5 million to 6.1 million. During that period, the rate of poverty for children under six grew dramatically, from 18 percent to 25 percent—or one child in four.[1]

In 1995, based on family income and:

- ☐ Excluding all government transfers (e.g. Social Security, unemployment compensation, workmen's compensation, etc.) for most minority and nonminority populations, the poverty rates for seniors was greater than that of children.
- ☐ Including government transfers, (for both children and adults) the poverty rate for minority and nonminority children was between 1.5 and 2.5 times the rate of their respective senior citizen counterparts (Table 9).

By any and all measurements the preponderance of transfer program finances provides a significant boost to the economic well-being of the older population; but only limited support to raise the economic standards of children!

‡A man who retired in 1995, after working 30 years at the average wage, contributed $30,691 to Medicare, but will typically get back benefits worth $80,442 after adjustments for inflation.[5]

Table 9 ☐ Persons in poverty by definition of income, race, Hispanic origin and age: 1995.[4]

Family income	Age			
	< 6	< 18	65-74	75+
Income before taxes (excluding capital gains) - used as the official definition of poverty				
White	18.2%	16.2%	7.3%	11.3%
African-American	48.9	41.9	20.3	32.9
Hispanic*	42.4	40.0	21.7	27.1
Income (excluding capital gains and government transfers**)				
White	20.9	19.2	41.8	59.4
African-American	52.4	47.0	52.1	71.5
Hispanic*	46.8	44.8	58.0	65.7
Income (including gov't transfers, Medicare & Medicaid, but excluding government taxes**)				
White	14.2	13.0	6.4	9.9
African-American	41.3	34.6	17.7	28.0
Hispanic*	34.4	32.9	17.9	22.6

*May be of any race.
**Government cash transfers include nonmeans-tested transfers (e.g. Social Security payments, unemployment compensation and workmen's compensation), government education assistance (e.g. Pell Grants) as well as means-tested transfers (e.g. Aid to Families with Dependent Children and Supplemental Security Income).[4]

WHY CHILD POVERTY VS MEDICARE AND SOCIAL SECURITY?

Now that the 1996 elections are over and the 105th Congress is about to convene, critical economic questions should (must!) be addressed in a somewhat less contentious setting. The political election rhetoric regarding plans to limit the future growth rate of Medicare and Social Security (reported as "cuts" by the opposing Republicans and Democratic candidates for the Congress and Presidency) played upon the fears of current and soon to be senior citizens.

The need to curtail the growth of these two major entitlement programs is confounded further by efforts to reduce and/or eliminate federal budget deficits. Added to this contentious fiscal atmosphere is the general reluctance to revisit the newly enacted welfare legislation, despite the projections that increasing numbers of children will be added to the poverty rolls as a result of reduced expenditure block grants to states, time limitations for welfare recipients and reevaluation of child disability claims.

In my roll as a teacher, I often use election day voting records to draw conclusions regarding the events in Congress. I believe that a critical barometer of the actions in Washington relate to the fact that approximately 65 percent of 65 year olds vote, about 20 percent of 20 year olds vote, and no children vote. In a time of fiscal constraints, when difficult competing decisions must be made, politicians seldom lose sight of the importance of the "first Tuesday after the first Monday of November". It matters little that current safety net systems ensure the economic viability of most older persons and only to a limited extent protect the one in five children (less that 18 years) and the one in four children (less than six years) who live in poverty.

While pediatric health practitioners view the economic, social and health conditions of the youngsters in our communities as crucial factors for their and our future, the reality is that the needs of children are but a single item in a complicated contending series of demands that must be resolved in some manner to meet the economic needs of our country, the influence of various pressure groups, and (to no small degree) ensure the reelection of the politicians involved.

The poverty of our children is in competition with the demands of the older population of our nation, even if we already have taken significant measures to protect the economics of our seniors. Whether it is pressure on the news media, personal contact with members of Congress or a general public relations effort—the message must be clear, IT IS THE CHILDREN'S TURN!

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Raising children is expensive in the 1990s and beyond

H. Barry Waldman, BA, DDS, MPH, PhD

Children are expensive, but worth it—that was the conclusion of a previous review in the *Journal of Dentistry for Children* that considered the costs of raising children during the 1980s.[1] While a series of recent reports by the Department of Agriculture and the Bureau of the Census do not consider whether "children are worth it" they do provide an update on the annual costs of raising children in the mid-1990s and estimates of the future costs that families can anticipate as they plan for the future of their children.[2-6]

The emphasis in this presentation will be on the costs to individual families as they raise their offsprings through seventeen years of age and the economic consequences of increasing numbers of mothers entering the paid workforce. The previous review considered some of the seeming almost infinite number of community social service support programs that are established as economic "safety nets" for families.[1]

COSTS OF RAISING A CHILD

More than $145,000 in "usual costs" (in 1995 dollars, or $239,000 in projected inflated dollars) will be needed to raise a child born in a middle income husband-wife family during the mid-1990s. Note: The Bureau of the Census reports the national middle range of income to be between $33,700 and $56,700, with an average income of approximately $45,000 (Table 1).

Approximately $48,000 for housing, $25,000 for food, $22,000 for transportation, $10,000 for clothing, $10,000 for health care, and thousands more for child care, entertainment and the myriads of other items are only the beginning (Table 2).* Note: "The estimates only cover out-of-pocket expenditures on children made by parents and not by others such as grandparents or friends."[2] (I must remember that the next time my wife and I are out shopping for our grandchildren.)

A college education would be an additional average annual cost of more than $6,000 in a public college and more than $15,000 in a private institution (Table 3).

The costs for a husband-wife family to raise a child through age seventeen ranges from about $107,000 for a lower income family (average income of $21,000) to about $212,000 for a higher income family (average income of $85,000). Although single-parent families report significantly lower family incomes than husband-wife families, they expend money to raise children at rates comparable to husband-wife families (between $101,000 and $213,000) (Table 2).

Families in different regions of the nation vary in their expenditures for children.

- ☐ Urban residents in the West Region spend more money than residents in other areas.
- ☐ Urban residents in the Midwest Region and rural

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*The dollar figures do not include all government expenditures on children. Examples of excluded expenditures would be public education, Medicaid and subsidized school meals. Other excluded costs include the added costs associated with premature births, developmental disabilities and other special population difficulties.

Table 1 ☐ Estimated selected annual expenditures* on children born in 1995, by income groups, overall U.S.[2]

Year	Age	Income group		
		Lowest	Middle	Highest
1995	<1	$5,490	$7,610	$11,320
2000	5	7,300	10,160	15,010
2005	10	9,760	13,300	19,340
2010	15	14,220	19,170	27,620
2012	17	15,800	21,300	30,690
Totals				
Including 5.4% annual inflation rate		$176,420	$238,840	$346,980
1995 dollars (removal of the effects of inflation)		106,890	145,320	211,830

*Estimates are for the younger child in husband-wife families with two children and include a 5.4 percent annual inflation rate.

Table 2 ☐ Estimated average cost of rearing youngest child from birth to age 18 by family structure and family income, overall United States: 1995.[2]

	Husband-wife families			Single-parent families	
	Family income				
	Less than $33,700	$33,700 to $56,700	More than $56,700	Less than $33,700	$33,700 or more
Average income	$21,000	$44,800	$84,800	$14,100	$51,100
Average expenses					
Housing	$34,950	$48,270	$78,450	$39,030	$78,180
Food	21,120	25,320	31,560	21,090	31,740
Transportation	15,900	22,110	29,730	11,430	35,190
Clothing	9,060	10,590	13,710	9,300	12,600
Health care	7,560	9,870	11,310	6,000	11,910
Child care & education	7,470	12,990	20,760	6,450	16,980
Miscellaneous**	10,830	16,170	26,310	8,280	26,640
Total	$106,890	$145,320	$211,830	$101,580	$213,240

**Includes personal care items, entertainment and reading materials.

Table 3 ☐ College costs: average annual charges for a full-time undergraduate in-state student by type of college: 1995–96.[2]

	4-year college		2-year college	
	Public	Private	Public	Private
Tuition & fees	$2,760	$10,514	$1,405	$6,564
Room & board	3,847	4,535	na	3,997
Totals	$6,607	$15,049		$10,561

Table 4 ☐ Total estimated annual expenditures on a child from birth to age 18 by husband-wife, in various areas of U.S.: 1995.[2]

	Income groups		
	Lowest	Middle	Highest
Urban			
West	$118,620	$157,020	$220,950
Northeast	113,700	151,470	214,410
South	108,720	148,260	213,420
Midwest	98,190	136,830	200,970
Rural (nationwide)	99,030	138,000	202,740

Note: Family average income in the three respective income groups varies by less than $1,000 in the different regions.

Table 5 ☐ Mediam family income by race, ethnicity and number of earners: 1995.[4]

	White		African American		Hispanic*	
	Number families	Income	Number families	Income	Number families	Income
0 earners	8.4	$19,663	1.4	$8,367	.8	$8,430
1 earner	16.1	30,600	3.0	18,774	2.3	17,972
2 earners	26.9	51,938	2.9	40,864	2.4	34,540

Note: Number of families in millions.
*May be of any race.

areas of the country spend the least funds (Table 4).

☐ Compared to residents of the urban Midwest Region, child-raising costs in rural areas of the country proportionately are greater for transportation, health care and child care and education, but proportionately less for housing (Figure).

INCREASES IN THE NUMBERS OF EMPLOYED MOTHERS

Two-earner families represent almost two-thirds (63 percent) of white families with earners and approximately a half of African-American and Hispanic families (may be of any race) (Table 5). Similarly income per family member increases with the availability of a second earner, including families with children and those without children (Table 6). In 1995, median income for female heads of families (no husband present) was $14,000.[4]

Note: The Bureau of the Census does not provide income per capita data for single-parent families, the overwhelming majority of which are headed by women. In 1994, 6.1 million single-parent white families were headed by women, compared to 1.2 million single-parent families headed by men; comparable data for African-American single-parent families were 3.4 million female- and .3 million male-headed families; for Hispanic families, 1.4 million female- and .2 million male-headed families.[7] In 1995, 18.9 million children (27 percent of all children) lived in single-parent families.[8]

CHILD CARE ARRANGEMENTS AND COSTS

In 1995, 31.1 million children (55.4 percent of all children less than fifteen years of age, 9.9 million children

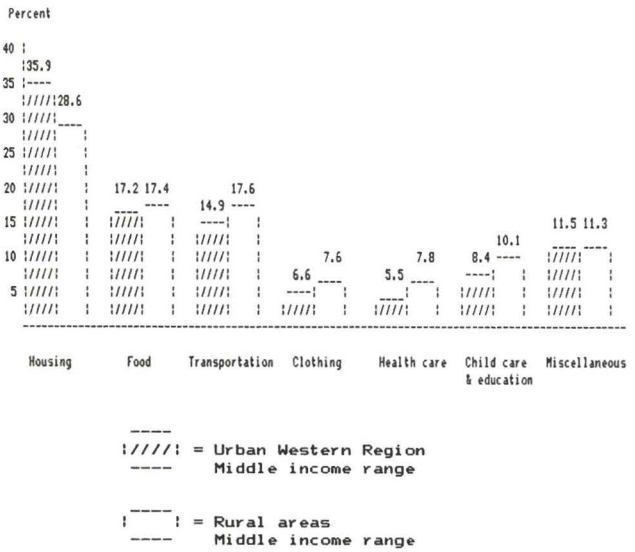

Figure. Percent distribution of estimated cost of rearing a child from birth to 18 in rural areas and a Western urban area by middle range income families: 1995.[2]

less than five years, and 21.2 million children five through fourteen years of age) had an employed mother (19.3 million mothers were employed).[5]

There are associated family costs in two-earner families (also in one-earner single-parent families) that must be considered when youngsters are involved—specifically, who's minding the children and at what cost?**

More than 90 percent of preschoolers are cared for in the child's home, another's home or in organized care facilities (Table 7), and child care costs continue to rise:

- ☐ Weekly costs for one child (in 1993 dollars):
  - 1986 - $64
  - 1988 - $72
  - 1990 - $72
  - 1993 - $79
- ☐ In-home babysitters and organized care facilities are most expensive.
- ☐ Costs are higher for infants and white children (white children are more likely to be in paid care arrangements, 60 percent for white children, vs 55 percent for African-American and Hispanic children). Costs are lower for shared arrangements and for two or more children.

Table 6 ☐ Income per family member: 1995.[4]

	1 child			2+ children	
	No children	<6 yrs	6–17 yrs	<6 yrs	Some <6 yrs
Married couples					
Husband worked					
Wife worked	$29,957	$18,703	$19,783	$14,302	$13,042
Wife not worked	23,412	13,647	16,060	11,482	10,078
Husband not worked					
Wife worked	20,301	na	12,585	na	7,376
Wife not worked	14,096	6,059	6,077	na	4,183

Note: Bureau of the Census considers working experience as "... any work for pay or profit or (work) without pay on a family-operated farm or business ..."[4] (My apologies to my wife and the millions of other wives and mothers [and men] whose family efforts are not considered "work".)

Table 7 ☐ Child care arrangements by employed mothers: 1991, 1993.[5,6]

	Age		
	<5 yrs (1991)	5-14 yrs (1991)	Preschoolers (1993)
Care in child's home	35.7%	10.7%	30.7%
Care in another's home	31.0	3.6	32.0
Organized child care facility	23.0	1.9	29.9
School based activity	0.5	3.0	{ 1.2
Kindergarten/grade school	1.1	76.2	
Child cares for self	—	2.7	—
Mother cares for child at work	8.7	2.0	6.2
Totals	100%	100%	100%

Table 8 ☐ Persons 15 years and older receiving child care support: 1995.[4]

	Number	Average annual amount
White	4,261,000	$3,531
African-American	788,000	2,321
Hispanic*	377,000	2,899

*May be of any race.

- ☐ Larger families, married couple families, families with older children and householders with higher education spend more money for the care of preschoolers.
- ☐ Child care is more of an economic burden for poor families (families below the poverty level spend 17.7 percent of income for child care, compared to 7.3 percent for families above the poverty level).
- ☐ Child care expenses are highest in the Northeast Region of the country and in metropolitan areas.[3]

For some families child support from nonresident parents does add some money, albeit relatively small amounts (Table 8).

The Internal Revenue Service does offer some relief for the costs of child care services in the form of reduced taxes—up to $2,400 in deductions from adjusted gross income per child younger than thirteen years for whom families expend child care money.[10] The standard de-

**See a previous presentation in the *Journal of Dentistry for Children* for an extended review the "other than economic costs" of child care for working parents.[9]

Table 9 ☐ Children and families living in poverty by race and ethnicity: 1995.[12]

		Percent
Percent of children less than 6 years		
	White	18.2%
	African-American	48.9
	Hispanic*	42.4
	Total	23.7%
Female householders with no husband present (children less than 18 years)		
	White	38.0%
	African-American	55.8
	Hispanic*	59.3
	Total	44.8%

*May be of any race.

duction ($2,550 per exemption from 1996 earnings) offers further tax relief.

But for many lower income families, the costs and/or the unavailability of child care services may be the critical factor in determining the possibility of employment by the mothers of young children.[11] In 1995, almost one child in four (23.7 percent) less than six years of age lived in families with incomes below the poverty line, including almost half (48.9 percent) of African-American preschoolers. In addition, almost 45 percent of female led households (no husband present) with children had incomes below the poverty level (Table 9).

Note: The effectiveness of the recent changes in welfare legislation will depend to a great degree upon the availability of reasonable cost child care programs for the children of low income families.***

AND WHAT OF DENTISTRY

"...there are competitive (financial) realities within which individual families and our society must make expenditure decisions."[1]

The conflicting economic demands involved in the raising of children, whether in a two-earner husband-wife family or a one-wage-earner single-parent family, is a reality for many families. While it "...borders on the sacrilegious to place a price on a child," unfortunately for many families a choice may need to be made between food, clothing, shelter and dental care.[1]

Dental care continues to be an out-of-pocket "felt" expenditure for many families in our communities. Note: For the past number of years government expenditures consistently have accounted for approximately 4 percent of national dental expenses, with the remaining fundings almost equally divided between out-of-pocket spending and premium paid health insurance.[14] By contrast, government expenditures in the mid-1990s for hospital and physician services represented, respectively, 59 percent and 32 percent of the costs.[15]

Helping families deal with the economic realities of dental services has become a fact of everyday life in many practices. It does help to know that while raising children may be expensive, few families would be willing to forgo the health needs of their children—if at all possible.

"While pediatric dentists cannot make the competitive decisions for parents, an awareness of the enormity of the costs in rearing children should provide an appreciation of the dilemma faced by (parents)..."[1]

***See a previous presentation in the *Journal of Dentistry for Children* for an extended review of the 1996 welfare reform legislation.[13]

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REPORTS

Eosinophilic granuloma: Report of case

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Robson Frederico Cunha, PhD

In 1953 Lichtenstein grouped three diseases, characterized by infiltrations and proliferations of histiocytes in different body tissues [Schüller's syndrome (Hand-Schüler-Christian disease), Letterer-siwe disease and eosinophilic granuloma] calling them histiocytosis-X.[1] The letter "X" stood for its uncertain etiology.[2]

In 1987 the Group of the Histiocyte Society presented a new classification and denomination for histiocytosis-X, based on histogenetic criteria. Among the different lesions, eosinophilic granuloma belongs to class I - Langerhans-cell histiocytosis.[3] It originates in the reticuloendothelial system, of unknown and non-neoplastic etiology, affecting predominantly children and young adolescents.[4-12] It can also occur in adults, with a predilection for males, in a 2:1 proportion, with no racial or geographical preference.[9-11,13]

The lesions appear only in the skeletal system, more frequently in the craniofacial bones, where one or more bones can be affected at the same time.[9,12,14]

Oral changes involve chiefly the molar and the angle of the mandible, and dental mobility can occur due to excessive resorption of alveolar bone, followed by premature loss of the tooth.[6,12,15] Fetid breath, pain, and occasional involvement of soft tissue and of the visceral system, especially of the lungs, can be also observed.[9,11,12]

They appear as well defined radiolucent areas in radiographs, with possibly a cystic appearance, sometimes with an irregular margin and without perforations.[6,12,15] The lesions can be either single or multiple, the teeth and alveolar bone may have resorptions, simulating an advanced stage of periodontitis.[5,6,12,13,15-18]

The prognosis after removing the lesion is favorable, followed by curettage, and occasionally radiotherapy; chemotherapy may be used when the lesion is polyostotic, or where the surgical access is impossible.[9,10,14,17,19-21]

CLINICAL CASE REPORT

C.D., an eleven-year-old male patient, was brought to the Department of Pediatric Dentistry, School of Dentistry of Araçatuba-UNESP, complaining about a lesion in his left mandible, a recurring swelling over a period of approximately eight months, after the loss of the primary tooth.

At the time of examination the patient had an elevated temperature without apparent reason, had lost weight and was generally uncomfortable.

The intraoral examination revealed a lesion in the area of the alveolar crest on the left side of the mandible, extending from the distal surface of the permanent lateral incisor, to the mesial surface of the second primary molar. It appeared as a single irregularly shaped nodule, sharply demarcated, 2 cm in diameter, and reddish in coloration. Its surface was covered with small lobes with

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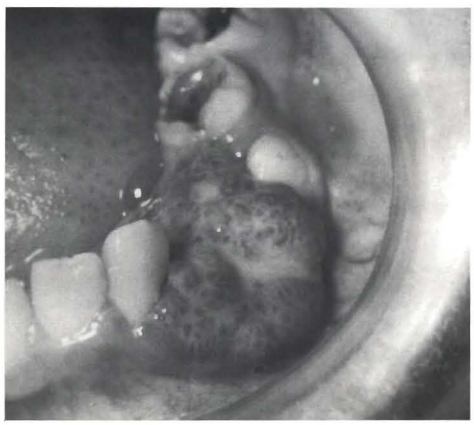

Figure 1. Lesion is an irregularly shaped nodule, in the lower alveolar edge of the mandible's left side, 2 cm in diameter, nonsymptomatic, pediculated base.

Figure 2. Panoramic radiograph showing a radiolucent circumscribed unilocular displacement and involvement of the canine and first premolar germs.

hepatic spots, separated by a yellow fissure; a nonsymptomatic, pediculated base; and adjacent mucosa normal in appearance (Figure 1).

A radiolucent, circumscribed and sharp unilocular image was observed in the radiograph, extending from the permanent central incisors to the mesial surface of the second primary molar, causing an expansion of the buccal and lingual cortical plates and a displacement of the germs of the canine and first premolar (Figure 2).

The differential diagnosis was that of hemangioma, giant-cell lesions, and eosinophilic granuloma. A biopsy made by aspiration and incision supported a diagnosis of histiocytosis-X because of the proliferation of Langerhans' cells. It was decided to curette the lesion along its entire length, preserving the germs of the canine and of the first premolar. The biopsy findings suggested examination of other areas of the body, using a scintilloscope. The scintillographic result showed an abnormal accumulation of the radiotracer (Tc99 MDP), only in a mandibular projection. The definite diagnosis was that of eosinophilic granuloma (Langerhans' cells histiocytosis solitary - histiocytosis-X).

The clinical and radiographic observations were made after the first three months, six months, one-year, two-year, and five-year postoperative, and the osteal recovery and eruption of the permanent teeth involved in the lesion were observed (Figures 3, 4).

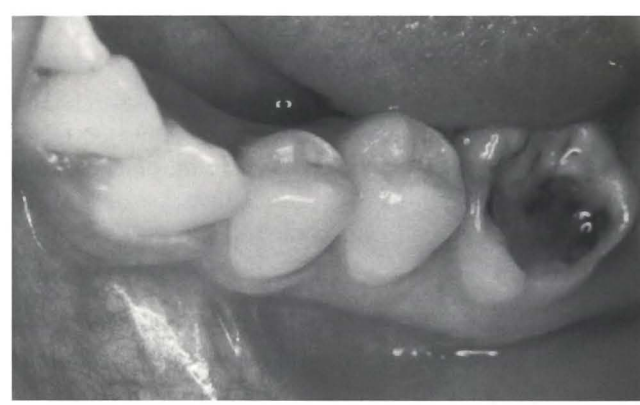

Figure 3. Clinical aspect in five years postoperative. Eruption of the permanent teeth involved in the lesion.

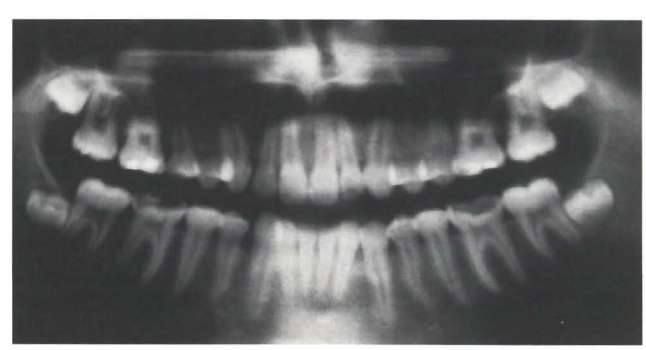

Figure 4. Panoramic radiograph in five years postoperative with the osteal recovery and radicular formation complete of the permanent teeth involved in the lesion.

DISCUSSION

In the works reviewed, the clinical features of the eosinophilic granuloma appear as an ulcerated lesion, or as

gingival swellings, bleeding, with painful symptomatology, and treated as an advanced periodontitis.[4,5,9,10,15,16,18-23] In the case presented, the lesion looked nodular, granulomatous, localized, and with a translucent image similar to a cyst (Figures 1, 2). It is important to point out that most lesions were first diagnosed as advanced periodontitis. Thus in the presence of similar lesions, one must suspect eosinophilic granuloma.

After the diagnosis of eosinophilic granuloma is confirmed, a survey must be made of the skeletal system to verify the presence of lesions in other parts of the body. Osteal scintillography is used for such, in spite of the Gerrard *et al* conclusion that conventional radiographs are better indicators of the disease than osteal scintillography.[24] The visceral system must also be traced, chiefly the lungs, which may be involved in 20 percent of the patients.[18] An occult involvement of bone marrow and lungs with a late manifestation may exist.[25]

The treatment of single maxillary lesions includes curettage and removal of the dental structures involved.[15,17,22,26] Ong and Lian utilized an intralesional injection of methylprednisolone, achieving the regression of the lesion following failure by curettage.[20] Hashimoto *et al* used an acetonide triamcinolone suspension with good results after radiotherapy failed.[19] Parkman reports that a substitute therapy with thymol extract has been producing recession of the disease. Such results are equivalent to those from chemotherapy.[7] Landrito *et al* conducted the surgical removal by means of an ultrasonic surgical aspirator, which allowed elimination of the lesion in fragments, quickly and controlled, keeping nerves and larger vessels intact, with a good recovery and without complications.[4] Like Broadbent and Pritchard, therefore, we opted for curettage retaining the germs of the teeth involved, due to the excellent prognosis with a high incidence of spontaneous recession of the localized diseases (Figures 3, 4). In addition to this, Finney *et al* were successful only with excision of the lesions in the soft tissues, and reserved radiotherapy and chemotherapy for lesions that could not be treated surgically.[10]

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Gingival overgrowth with valproic acid: A case report

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Drug-induced gingival overgrowth has long been associated with the use of phenytoin.[1,2] It has also been seen recently with the use of cyclosporine, and Ca++ channel blockers as nifedipine and nitrendipine.[3-5] There has been minimal information or reported occurrences of valproic acid-induced gingival overgrowth, a drug that has been used for the treatment of seizure disorders.[6,7]

Valproic acid is an anti-epileptic agent whose exact mechanism is unknown, but its activity may be related to increased brain levels of gamma-amino butyric acid. The drug is rapidly absorbed, bound to plasma proteins, and metabolized in the liver. It is used for petit mal and complex absence seizures. Complex absence seizures are very brief clouding of the sensorium or loss of consciousness lasting two to fifteen seconds, accompanied by other generalized discharges without detectable clinical changes. One major problem with the drug is possible dose-related hepatic damage. It is teratogenic and can affect drugs used for coagulation therapy. Some common side effects include nausea, vomiting, indigestion, transient hair loss, thrombocytopenia, and hyperammonemia.[8] Gingival overgrowth has only been reported in two isolated cases.[6,7]

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CASE REPORT

The patient was a nine-year-old black female, who was forty-seven inches in height, weighed thirty-five pounds, and whose vital signs were all within normal limits. The medical history was obtained on a written questionnaire completed by the patient's mother, oral interview with the mother, the patient's medical record, and written consultations from the patient's primary physician. The patient was diagnosed early in infancy to have cerebral palsy with a hydrocephalus, and had a VP (ventriculoperitoneal) shunt placed. The patient was also born with toxoplasmosis, which led to blindness. The patient had her first seizure at two months and had been placed on valproic acid since that time with frequent monitoring of blood levels. The patient was developmentally disabled, mentally retarded, and had spastic quadriplegia, which confined her to a wheelchair. She also had a gastrostomy tube in place for two years. All oral hygiene was performed by the parents. The current medications included valproic acid syrup 6cc (300 mg) twice daily, and phenobarbital 30 mg twice daily.

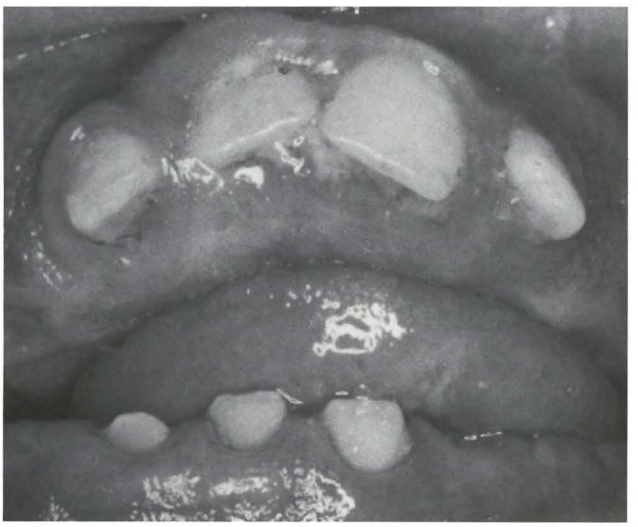

Figure 1. Frontal view showing generalized overgrowth. A draining abscess was present on maxillary right central incisor.

Figure 2. Gingival overgrowth on mandibular right molar (mirror photograph).

Case findings

Only a cursory oral examination was possible, due to difficulty in patient management. Substantial generalized gingival overgrowth, however, was evident (Figure 1). Consultation with a pediatric dentist was done to coordinate treatment that was planned using general anesthesia. The patient's gastrostomy tube was also nonfunctional and it was to be replaced by a general surgeon while the patient was anesthetized for the dental treatment.

Case management

The patient had a preoperative coagulation profile, CBC, urinalysis, chest x-ray, and an anesthesia consultation. An informed consent briefing was given to the patient's mother and all alternate treatments, risks, and possible complications of the procedure were explained.

The patient was anesthetized, and the general surgeon replaced the defective gastrostomy tube. Then the patient was draped for the dental procedures. Minimal local anesthesia of 2 percent xylocaine with 1/100,000 epinephrine was given to control bleeding. Periapical and bitewing radiographs were taken, and the pediatric dentist decided to extract unrestorable teeth, which included the right maxillary primary first and second molars, left maxillary primary second molar, left mandibular primary first and second molars, and the right mandibular primary second molar. The right maxillary permanent central incisor was extracted due to a large draining periapical abscess.

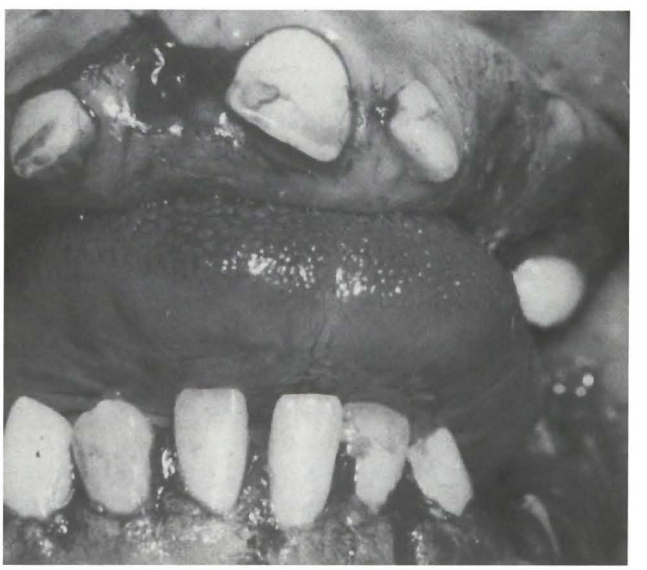

Figure 3. A full-mouth gingivectomy was performed using externally beveled incisions with a scalpel and rotary diamond instruments.

Extensive generalized gingival overgrowth was present, and a large alar growth of tissue was seen lingual to one of the mandibular permanent first molars (Figure 2). A smaller enlargement was seen on the lingual of the

opposite mandibular permanent first molar. A full-mouth gingivectomy was performed using externally beveled incisions with scalpels and rotary diamond instruments (Figure 3). Tissue was submitted for histological examination and surgical sites were packed with saline dampened gauze. The patient was moved to the recovery room, and discharged on the following day.

Histological Ændings

The tissue biopsy was diagnosed as "fibrous hyperplasia of the gingiva" consistent with a clinical impression of drug-induced gingival overgrowth. The histologic changes were consistent in all sections taken of three separate tissue samples.

DISCUSSION

There have been a few isolated case reports of the effect of valproic acid or sodium valproate in causing gingival overgrowth. One study by Seymour compared the periodontal health of two matched groups of adult epileptic patients treated with either sodium valproate or phenytoin to a control group.[9] Test patients had been on either 300 mg/day of phenytoin or 600 mg/day of sodium valproate for two years. The sodium valproate group did not differ significantly from the matched control for any of the clinical factors of plaque index, gingival index, or probing depth. Another study evaluated pediatric patients on sodium valproate and also demonstrated no gingival drug effects.[10]

One of the two reported cases of sodium valproate "gingival hyperplasia" was noted in a fifteen-month old male and began one month after the initiation of drug therapy.[6] The tissue became red, edematous, and bled easily; when the dosage was decreased, the tissue improved. Histologically, an increase in connective tissue and a marked inflammatory reaction was observed. There were dilated capillaries and a considerable number of mast cells, many of which were disrupted, possibly implicating them in the pathogenesis of the lesion. This effect on the tissue appeared to be more inflammatory and may possibly have been an untoward or hypersensitive reaction to plaque. The present case's histologic section did not show any of the previously mentioned changes with the exception of the increase in connective tissue.

The second of the reported cases of sodium valproate-induced "gingival hyperplasia" occurred in a fourteen-year-old female. The "gingival hyperplasia" began eighteen months after the drug was initiated and was mainly seen on the labial surfaces of the mandibular anterior teeth. The patient was switched to an alternative drug and the "gingival hyperplasia" regressed completely in three months.[7] This young female may have had an inflammatory reaction possibly related to the drug (although it was eighteen months after initiation of the drug therapy.) Most reactions to phenytoin or other drugs associated with gingival overgrowth first occur in the initial six months of drug therapy. An actual gingival overgrowth would seem unlikely to regress without any other therapy besides drug cessation; an inflammatory reaction caused by possible drug sensitization of the gingival tissues, however, could regress. It seems that any type of allergic stomatitis would occur rapidly, and not eighteen months after drug initiation. This female may also have had hormonal changes from puberty, which may have been the primary or a strong secondary cause for the "gingival hyperplasia".

This case was quite different from the previously reported cases, in that the tissue resembled other drug-induced gingival overgrowths, both in the clinical and histological appearance. The tissue was firm and posterior alar-like growths of tissue had occurred. It is possible that this may have been an unusual reaction to chronic inflammation, except that this tissue was generally firm with a minimal amount of marginal inflammation in most areas. This patient may also have idiopathic gingival overgrowth as a possible diagnosis. The primary physician did not want to change the medication for this patient since she has had excellent seizure control so we were unable to determine whether any changes would occur when the medication was ceased.

The etiology of drug-induced gingival overgrowth has not been determined exactly and there have been several possible mechanisms. One theory suggests that there is a direct effect on a subpopulation of fibroblasts.[11] Among the several subpopulations of fibroblasts, some produce high amounts of collagen (high activity), and others do not produce significant amounts of collagen (low activity). High activity fibroblasts in the presence of inflammation may become "sensitized" by a drug and there may be a subsequent increase in collagen production.[12] Alternately, an anti-convulsant drug may be cytotoxic to the low activity fibroblasts, or there may be a drug-induced collagenase decrease.[13,14]

A second theory proposes that the anticonvulsant drug may cause a depletion of folic acid, which may affect sodium ion transport.[15] The decrease in cellular folic acid may also lead to a decreased production of collagenase activator enzyme. An additional mechanism of folic acid may be in an impaired maturation of the epithelium,

making the connective tissue more susceptible to inflammation.[16] Various studies have shown mixed and inconclusive results on the effect of folate on gingival overgrowth.[16-18] A specific theory on cyclosporine-induced overgrowth by Deliliers states that the cyclosporine-induced gingival overgrowth should be classified as an allergic type of reaction based on the plasma cell infiltrate that is seen.[19]

A final theory proposes that divalent cations such as Ca++ can act as agents that promote phagocytosis. The plasma membrane and subplasmalemmal zone of phagocytic cells contain Ca++ and Mg++ dependent ATPase activity. Thus, it may be significant that the drugs that induce gingival overgrowth may have an inhibitory influence on Ca++ ion passage across cell membranes or may interfere with the interaction of intracellular ionic calcium and calmodulin leading to greater synthesis of collagen and less phagocytosis.[20]

CONCLUSION

This case is different from the previous reported cases in that the histologic and clinical appearances were similar to a "gingival overgrowth" phenomenon as opposed to an inflammatory reaction as noted in previous reports.

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RELATION OF CURE-TIME TO WEAR AND MARGINAL BREAKDOWN OF COMPOSITES

This study has shown that the abrasive wear of an experimental dental composite is correlated with the degree of conversion of the polymer matrix formed during polymerization. The results imply that maximum wear resistance requires that the composite be cured to its maximum amount. A post-light-curing heat treatment caused an increase in wear resistance, but the result was not significantly different from that obtained with the light-cured-only material at 2 yrs. However, the heat treatment did produce a greater resistance to marginal breakdown for a microfill composite. Marginal breakdown for the small-particle hybrid composite was negligible. The data emphasize to the clinican her role in determining the success of composites subjected to abrasive wear conditions by ensuring optimum light curing. This can be done by using proper illumination times, checking bulbs for proper output intensities, using clean and undamaged light-curing tips, placing the curing tip as close as possible to the composite, and avoiding obstructions to the light path whenever possible.

Ferracane, J.L.: Wear and marginal breakdown of composites with various degrees of cure. J Dent Res, 76:1508-1516, August 1997.

Anomalies of tooth form and number in the permanent dentition: Report of two cases

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Anomalies of tooth form and number result from abnormal events in the embryologic development of teeth. Hypodontia and anodontia refer to partial or total absence of teeth. Supernumerary teeth are extra teeth formed by hyperactivity of the dental lamina.[1]

Some dental anomalies are precisely defined, but this is not always the case.[2,3] Gemination is defined as a single tooth bud that has attempted to divide, resulting in a tooth with a single root and large bifid crown. Twinning is the formation of two equivalent teeth from a complete gemination.[4] This anomaly can be confused, however, with a supernumerary tooth. The term fusion refers to two or more tooth germs forming one single tooth with two pulp chambers and their respective root canals. Depending on the stage in which the tooth germs join together, fusion may occur at developmental levels of enamel, dentin or cementum. In the latter case, the term concrescence is used.[2] Complete fusion is the term used when tooth germs unite before calcification, resulting in a tooth with a single pulp chamber and root canal. Macrodontia must be considered in the differential diagnosis of cases of gemination or complete fusion.[5]

This report describes two unusual cases of bilateral permanent double teeth in the maxilla. They illustrate the difficulties of making a precise diagnosis and in treating these anomalies.

REVIEW OF LITERATURE

Anomalies of tooth form and number occur more frequently in the permanent dentition, except that fusion, more commonly, affects primary teeth.[6] The prevalence of double formations in the primary and permanent dentitions is 0.1 percent to 0.9 percent and 0 percent to 0.2 percent, respectively.[6-9] Bilateral double teeth are less frequent with prevalence of 0 percent to 0.04 percent in the primary and 0 percent to 0.05 percent in the permanent dentition.[9] There is a predilection for the anterior areas of the jaws.[6,9,10]

Fusion is most often seen in the lower primary incisor and canine regions, with 78.2 percent chance of aplasia of a succedaneous lateral incisor.[6] The association of dental anomalies and mental disorders suggests the participation of the neural crest in dental development.[11]

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Supernumerary teeth are usually seen in the permanent dentition, especially in the anterior maxillary area. The incidence is estimated as 0.15 percent to 1.0 percent.[5]

The etiology and pathogenesis of these dental anomalies are not clear.[5,12-14] In pregnant rats, high doses of vitamin A can cause anencephaly and dental fusion.[15] Hitchin and Morris described the ontogeny of connate incisors in dogs and showed that the primary disorder is the persistence of the interdental plate.[12] They also showed the role of inheritance in the formation of double teeth.[12] There is some agreement that in humans double teeth follow a hereditary pattern.[2,6,12,16] Fused teeth may result from some physical action that causes the tooth germs to come into close contact, with necrosis of the interdental tissue.[17] This process, however, has not been clearly demonstrated.

The differential diagnosis between fusion and gemination is difficult, and possibly academic.[2,11-13,18-22] Many early reports of double formations did not differentiate between fused and geminated teeth and used the terms twinning, double fused or connate teeth.[11,12,18-21] Some authors suggest the counting of teeth as an aid to the diagnosis: if the double formation is considered as one, tooth fusion should result in a smaller number of teeth, while gemination results in a normal number of teeth.[23] This method does not consider that fusion may occur between two normal teeth or between a normal and a supernumerary tooth. In the latter case, the clinical appearance is similar to gemination.

Various clinical problems can be associated with these dental anomalies. Caries is common in the groove dividing a bifid crown.[13,24,25] Dental care is necessary for orthodontic, periodontal, and esthetic reasons.[25-27]

REPORT OF CASES

Case 1

A healthy eight-year-old Caucasian boy came to the pediatric dental clinic of the Faculty of Odontology of Piracicaba—UNICAMP for dental care. Oral examination revealed a mixed dentition, poor oral hygiene and caries in six of the eight primary teeth present. The early loss of four primary teeth probably was due to caries.

The maxillary permanent right central incisor was erupted and had a very large crown (13 mm mesiodistally), with a sulcus in the middle of the labial surface. Radiographically this central incisor showed a large pulp chamber and one root canal. A conoid tooth was adjacent to the incisor. The left central incisor had only the incisal third erupted, but there was an enamel projection on the labial surface. It was evident radiographically that this tooth had two distinct pulp chambers and root canals, with the crowns fused mainly in the enamel. The adjacent lateral incisor had a normal morphology. Both maxillary permanent canines and premolars had well-formed crowns according to radiographs (Figures 1, 2). There were no mandibular anomalies. The medical and familial histories were noncontributory.

After six months, the left maxillary central incisor showed more clearly the enamel projection on the labial surface. Distally a gingival prominence indicated that the adjacent tooth was erupting in a labial position, due to lack of space in the arch (Figure 3). In the right maxillary quadrant, there were no significant changes.

Case 2

An eight-year-old Caucasian boy had both maxillary central incisors with large crowns, each measuring 13 mm mesiodistally. The right central incisor had a carious cleft in the middle of the labial surface (Figure 4). The left central incisor had an enamel projection on the palatal surface, similar to that in Case 1. The maxillary lateral incisors had erupted palatally (Figure 5). The remaining six primary and eight permanent teeth that had erupted were normal, without caries. Medical and familial histories were noncontributory.

Figure 1. Case 1. Clinical view of the upper central incisors with double formation.

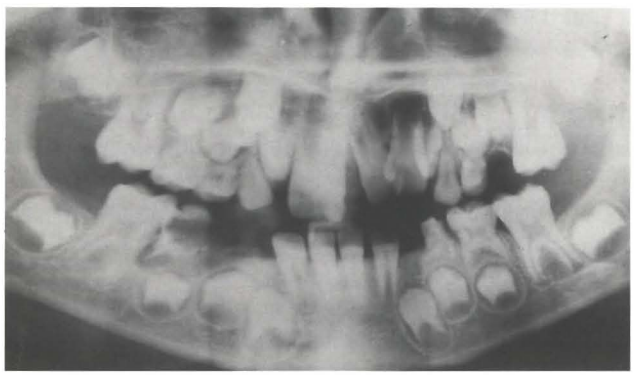

Figure 2. Case 1. Panoramic radiograph showing, in the maxillary right quadrant, a central incisor with a large pulp chamber and root canal. A lateral conoid tooth is adjacent. In the left maxillary quadrant, the two distinct pulp chambers and root canals of the central incisor are evident. The adjacent lateral tooth had a normal morphology. No other anomalies are present.

Figure 3. Case 1. Central incisors after six months. The left one showed more clearly the enamel projection on the labial surface. Distally a gingival prominence indicates the adjacent conoid tooth erupting.

Radiographically, the maxillary central incisors had similar morphologies, with a large pulp chamber and single root canal. The lateral incisors and the remaining teeth, erupted or not, were all normal (Figures 6, 7).

Figure 4. Case 2. Clinical view of the upper central incisors. A carious cleft is evident on the right central incisor.

Figure 5. Case 2. Maxillary lateral incisors that erupted palatally. The left central incisor had an enamel projection on the palatal surface.

DISCUSSION

The two cases reported here had bilateral anomalies of form and number in the permanent dentition. The exact nature of these rare double teeth defects is nebulous.[9] In Case 1, using traditional nomenclature, the following diagnoses were considered for the maxillary right quadrant:

- ☐ Gemination of the central incisor and the presence of an anomalous lateral incisor.
- ☐ Complete fusion of the central and lateral incisors and the presence of a supernumerary lateral incisor.

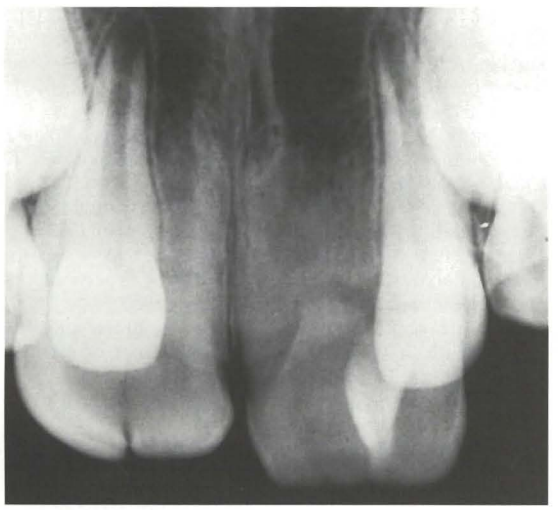

Figure 6. Case 2. Occlusal radiograph showing the upper central incisors with a single pulp chamber and root canal. The lateral incisors had a normal morphology.

Figure 7. Case 2. Panoramic radiograph showing the normal morphology of all teeth, except the upper central incisors.

☐ Complete fusion of the central incisors with a supernumerary, and the presence of an anomalous lateral incisor.
☐ Macrodontia of the central incisor and presence of an anomalous lateral incisor.

We consider the second hypothesis as the most probable.

The possible diagnosis for the maxillary left quadrant include:

☐ Fusion of the central incisor with a supernumerary tooth.
☐ Fusion of central and lateral incisors, and presence of a supernumerary lateral incisor.

As for the right quadrant we considered the most probable diagnosis to be the second hypothesis.

For Case 2 the hypotheses for both quadrants were:

☐ Gemination of the maxillary central incisors.
☐ Complete fusion of the central incisors with supernumerary teeth.
☐ Macrodontia of the central incisors.
☐ Combinations of the three hypotheses above.

Clinical and radiographic evidence indicates that the most probable is the first hypothesis.

Though few of the cases described in the literature discuss the treatment plan, the treatment of dental anomalies, particularly in the permanent dentition, must be considered.[25,26] Large incisors influence the anterior alignment and arch symmetry, possibly causing serious periodontal, orthodontic, and esthetic problems.[18,19,24-27]

Let us consider the right quadrant of Case 1. We suggest waiting for the root formation of the central incisor to be complete. After making selective slices from the proximal surfaces, the teeth will be restored with composite resin. The adjacent conoid tooth should be extracted because of the unsatisfactory morphology and the lack of space in the dental arch. The primary canine should also be extracted because the permanent canine will take the space of the lateral incisor. The crown of the canine could be modified to appear like a lateral incisor to improve esthetics. Selective slices of the palatal cusp of the premolar should prevent occlusal interferences.

In the left quadrant of Case 1, the tooth adjacent to the central incisor, and erupting in a labial position, should be extracted. The large incisor should be separated and each half restored with composite resin. This separation must be made after complete root formation and endodontic therapy, because of the possible communication between the pulp chambers. Some authors have considered the complexity of the pulp chamber in these anomalies.[13,14,26] Orthodontic alignment would then be necessary.

For Case 2, extraction of the maxillary lateral incisors is indicated, because of the discrepancy of space in the anterior area of the maxilla (−10.5 mm in the Moyers' analysis). Selective slices of 2.0 mm could be made on the proximal surfaces of the two large incisors. Composite resin restorations would improve esthetics. Selective slices should also be made on the palatal projection of the left maxillary central incisor to remove occlusal interferences. The maxillary primary canines should be extracted and the permanent canines restored as lateral

incisors. The maxillary first premolars should be sliced to adapt the occlusion. For prevention of further caries, the groove of the right incisor can be restored and the palatal sulcus sealed. The crossbite involving the maxillary right central incisor could be resolved with a discreet slice of the mesioincisal surface. Orthodontic alignment could be made.

Dental anomalies as described here illustrate the difficulties in making a precise diagnosis, and the necessity for adequate treatment.[2,11-13,19-27]

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FUNGAL SINUSITIS

Fungal infection should be considered in all patients with chronic sinusitis. Early diagnosis of noninvasive fungal sinusitis may prevent multiple surgical procedures and lead to effective treatment. Invasive fungal sinusitis should be suspected in immunocompromised patients with acute sinusitis, inflammation of nasal septal mucosa, unexplained fever or cough, or the orbital apex syndrome. All three forms of invasive fungal sinusitis are associated with reasonable rates of response if diagnosed and treated early.

de Shazo, R.D. *et al*: Fungal sinusitis. N Engl J Med, 337:254-259, July 24, 1997.

ABSTRACTS

Donly, Kevin J. and Nelson, Jeffrey J.: Fluoride release of restorative materials exposed to a Øuoridated dentifrice. J Dent Child, 64:249-250, July-August 1997.

The purpose of this study was to examine the effect that brushing with a fluoridated dentifrice (Crest® - Procter and Gamble) has on the fluoride release of restorative materials. Thirty standardized discs were fabricated; 10 were P-50® (3M) nonfluoridated composite resin (control), ten were Heliomolar® Radiopaque (Ivoclar/Vivadent) fluoride releasing composite resin, and ten were Ketac Fil® (ESPE) glass ionomer cement. Specimens were placed into separate containers of 10 mL deionized water. Half the specimens from each group were brushed with fluoridated dentifrice for two minutes twice per day and rinsed. The fluoride level of each specimen was evaluated for thirty days, using a fluoride specific ion analyzer. An analysis of variance (ANOVA) and Duncan's test ($p < 0.05$) indicated significant differences in fluoride release. The brushed glass ionomer was significantly higher than all other groups and the glass ionomer not brushed was significantly higher than all composite groups. Glass Ionomer Cement-brushed > Glass Ionomer Cement > Fluoridated Composite Resin-brushed = Fluoridated Composite Resin = Composite Resin-brushed = Composite Resin. Brushed glass ionomer appears to release the highest fluoride level, acting as a fluoride reservoir from the dentifrice for subsequent fluoride release.

Fluoridated dentifrice; Fluoride level; Restorative materials

Gruythuysen, Rene J.M. and Weerheijm, Karin L.: Calcium hydroxide pulpotomy with a light-cured cavity-sealing material after two years. J Dent Child, 64:251-253, July-August 1997.

In this follow-up study a light-cured glass ionomer lining cement was evaluated as a cavity-sealing material in calcium hydroxide pulpotomies in primary molars after one and two years. The pulpotomy dressing was a suspension of pure calcium hydroxide with either tap water or sterile saline. The success rate of the pulpotomies after one year was 87.7 percent and after two years 80.4 percent (clinically and radiographically).

This result was only influenced by the type of restoration (amalgam versus stainless steel crown). The results of the present investigation compare favorably with those of other published studies of pulpotomy of primary molars using calcium hydroxide as the wound dressing.

Pulpotomy; Calcium hydroxide; Amalgam; Steel crown

Fuks, Anna B.; Eidelman, Eliezer; Cleaton-Jones, Peter *et al*: Pulp response to ferric sulfate, diluted formocresol and IRM in pulpotomized primary baboon teeth. J Dent Child, 64:254-259, July-August 1997.

This study investigated the pulp response to a 15.5 percent ferric sulfate solution (FS) and a 20 percent dilution of formocresol (DFC) in pulpotomized primary teeth of baboons, after four and eight weeks. Pulpotomies were performed in seventy-nine primary teeth of 4 baboons. After coronal pulp resection, the pulp stumps were painted with ferric sulfate for fifteen seconds, in thirty-two teeth (group 1); in another thirty-two teeth, a cotton pellet moistened with dilution of formocresol was placed over the pulp stumps for five minutes, and removed (group 2). In fifteen teeth, IRM was placed directly over the pulp stumps after hemostasis (group 3 - control). The teeth of all groups were sealed with IRM, and examined for inflammatory changes under a microscope by two blinded examiners. Seventy-seven teeth were assessed.

Mild or no inflammation was found in 58 percent (18/31) of the teeth of group 1, in 48 percent (15/31) of those of group 2, and in 73 percent (11/15) of those of group 3. Severe inflammation was found in 35 percent (11/31) of group 1, 29 percent (9/31) of group 2, and in 7 percent (1/15) of group 3. No statistically significant difference between the three groups was observed for degree of inflammation, periradicular or interradicular abscess or inflammatory root resorption (chi-square $p > 0.05$). Dentin bridges were observed in 52 percent (16/31) of the teeth in group 1, 52 percent (16/31) of those of group 2, and in 73 percent (11/15) of those of group 3. No difference was found between the experimental and control groups for the presence of dentin bridge, ($p > 0.05$).

Ferric sulfate produced pulp responses that compared favorably to those of diluted formocresol.

Pulpotomy; Baboon primary teeth; Ferric sulfate; Dilute formocresol; IRM

Suzuki, Junji; Komatsuzawa, Hitoshi; Kozai, Katsuyuki *et al*: In vitro susceptibility of *Staphylococcus aureus* including MRSA to four disinfectants. J Dent Child, 64:260-263, July-August 1997.

The spread of nosocomial infections caused by pathogenic organisms such as methicillin-resistant *S. aureus* (MRSA) has prompted the dental community to focus more attention on certain control strategies. In the present study, we tested the abilities of the four skin disinfectants (povidone iodine, benzalkonium chloride, chlorhexidine gluconate, and ethanol) to prevent horizontal transmission of MRSA in the dental office. The bactericidal activities of the disinfectants were evaluated by the decrement over time of viable cell numbers of four clinical isolated strains of *S. aureus:* two MRSA strains and two methicillin-sensitive *S. aureus* (MSSA) strains. The most effective disinfectant was 70 percent ethanol, which eradicated both MRSA and MSSA in less than three minutes. The 0.1 percent chlorhexidine gluconate proved the least effective of

four disinfectants. More than 10^2 bacteria survived despite exposure to it for thirty minutes.
Nosocomial infections; Skin disinfectants; Ethanol

Behrendt, Annekathrin; Vahrson, Knut; Wetzel, Willi-Eckhard: Consequences of serious oral injury associated with the congenital analgia syndrome. J Dent Child, 64: 264-266, July-August 1997.
Three sisters at the ages of seven months, twelve years, and thirteen years presented with the initial damages to the oral tissues and the distinctive long-term effects in conjunction with the congenital analgia syndrome. The severity of this syndrome justifies the consideration of a prophylactic extraction of the primary dentition. A controlled mastication will be more likely with increasing age and eruption of the permanent teeth.
Analgia; Analgesia; Pain indifference

Bimstein, Enrique and Eidelman, Eliezer: Treatment trends during a thirteen-year period in a student pediatric dentistry clinic. J Dent Child, 64:267-271, July-August 1997.
This manuscript reports the treatment trends in a pediatric dentistry clinic from 1980 to 1992 and discusses their implication in clinical teaching. Analysis of the records of the senior year pediatric dentistry students indicated: no significant change with time in the patients/student ratio, the number of preformed crowns, pulpotomies, and pulpectomies by student or by patient; a significant decrease in the number of one-surface and ≥2-surface restorations by student and by patient; a significant increase in the number of pit-and-fissure sealants and preventive resin restorations by student and by patient. During the thirteen-year period, the students performed an average of 7.3 one-surface; 12.9 ≥2-surface restorations; 5.5 preformed crowns; 6.4 pit-and-fissure sealants; 2.4 pulpotomies. There was a significant increase with time in the number of students who performed pit-and-fissure sealants.
Treatment trends; Implications for teaching

Filippi, Andreas; Pohl, Yango; Kirschner, Horst: Replantation of avulsed primary anterior teeth: Treatment and limitations. J Dent Child, 64:272-275, July-August 1997.
In addition to the successful replantation of avulsed permanent teeth, the replantation of primary anterior teeth may also be indicated. The decision is based on age and stage of tooth development, development of dentition, storage of the avulsed tooth and the way it is transported to the treatment site, the appropriate in vitro treatment of the tooth before reinsertion, and the willingness of the child to cooperate. A method involving retrograde filling of the primary tooth root with calcium hydroxide after resecting the root apex has proved successful. Other commercially available root filling materials and pins are not indicated. Calcium hydroxide allows the tooth to heal in place without reaction and prevents the development of apical periodontitis. As regards any surgical intervention, the attending dentist in this case has to weigh the benefits against the risks.
Avulsed primary teeth; Replantation; Determining factors; Calcium hydroxide

Sharaf, Aly A.T.: Evaluation of mandibular inÆltration versus block anesthesia in pediatric dentistry. J Dent Child, 64:276-281, July-August 1997.
The clinical effectiveness of mandibular block anesthesia was compared to that of buccal infiltration anesthesia. A total of eighty patients three to nine years old was selected with identical bilateral lesions. The anesthetic used was mepacaine HCL 2 percent. The treatments performed were restorations, pulpotomies, and extractions. Child behavior and pain reaction were recorded and rated at certain intervals of treatment, using the Frankl behavioral scale and the SEM scale. The Eland color scale was also used in another sample of twenty patients to determine which type of anesthesia was more acceptable to children. The paired t-test was used to compare results.

Buccal infiltration anesthesia was found to be as effective as block anesthesia in all situations, except when pulpotomies were performed in the mandibular second primary molar, where it proved to be unreliable regardless of age. Block anesthesia was significantly more painful than buccal infiltration anesthesia, and behavior of children three through five years old sometimes turned negative following the block injection.
Mandibular block anesthesia; Buccal inÆltration anesthesia

Waldman, H.B.: Child poverty vs Medicare and Social Security. J Dent Child, 64:282-286, July-August 1997.
The series of government safety net programs provides economic security primarily to older populations. In this period of competition for limited federal resources, the need to create a public awareness of the continuing and growing poverty of children is emphasized.
Poverty of children; Safety net programs

Waldman, H.B.: Raising children is expensive in the 1990s and beyond. J Dent Child, 64:287-290, July-August 1997.
Costs of raising children continue to rise. At the same time, the marked increase in the proportion of two-earner families and single-parent families places added burdens on families to develop and pay for child care arrangements. A review is provided of current and anticipated financial costs of raising children during the 1990s and planning for the finances of their future years.
Costs of child-rearing

See Abstracts page 304

Delbem, Alberto Carlos Botazzo; Percinoto, Célio; Cunha, Robson Frederico: Eosinophilic granuloma: Case report. J Dent Child, 64:291-293, July-August 1997.

This paper related a case of eosinophilic granuloma in an eleven-year-old male child, treated successfully with curettage. The lesion appeared as a single irregular nodule in the left mandibular alveolar crest. A radiolucency was observed in the radiograph apparently causing an expansion of the vestibular and lingual cortical plates and displacement of the germs of the canine and first premolar. The treatment was by curettage, retaining the germs of the teeth involved. Other parts of the body were examined by osteal scintillography. Clinical and radiographic observations were done in the first three months; one year; two years; and five years postoperative with excellent prognosis.

Eosinophilic granuloma; Curettage

Anderson, Howard H.; Rapley, John W.; Williams, David R.: Gingival overgrowth with valproic acid: A case report. J Dent Child, 64:294-297, July-August 1997.

A case of a nine-year-old epileptic girl with severe gingival overgrowth who had been taking valproic acid since two months of age is presented. A review of the literature and possible mechanisms for drug-induced gingival overgrowth is outlined.

Valproic acid; Gingival hyperplasia; Epilepsy

Graner, R.; Rontani, R.M.; Gavião, M. *et al*: Anomalies of tooth form and number in permanent dentition: Report of two cases and review of literature. J Dent Child, 64: 298-302, July-August 1997.

Two cases of bilateral double teeth involving the permanent maxillary central incisors are described. The difficulties in establishing the precise diagnosis are considered. The treatment plans also are discussed. The etiology and nomenclature of these dental formations and number of anomalies are reviewed.

Anomalies; Form; Number