



## A 20-year perspective on the changing use of hand over mouth (HOM) and restraint in postdoctoral pediatric dental education

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### Abstract

**Purpose:** This study assessed the current teaching and utilization of the hand over mouth technique in advanced educational programs in pediatric dentistry and compared these results to previous surveys.

**Methods:** A survey, identical to those used in 1979 and 1989, was sent to pediatric dentistry program directors. Descriptive and comparative statistics evaluated the use of HOM, HOMAR, and restraint. Additionally, changing patterns of responses for programs and directors that responded to both the 1989 and 1999 surveys were assessed.

**Results:** Eighty-seven percent of directors returned surveys. There was a significant decrease in the number of programs utilizing the HOM technique in the past 10 years ( $P < 0.0001$ ). Among respondents that returned surveys in 1989 and 1999, 50% of the previous HOM users discontinued its use ( $P < 0.03$ ). Technique non-users were significantly less likely to describe the technique consistent with AAPD guidelines ( $P < 0.0001$ ). Although the 1989 respondents expressed significantly decreased certainty that restraint techniques were free of psychological sequelae compared to 1979 respondents, the continuing decreasing trend observed between the 1989 and 1999 groups was not significant.

**Conclusions:** With continuing uncertainty regarding psychological sequelae associated with HOM, there was a significant decrease in the number of programs advocating its use. (*Pediatr Dent* 23:301-306, 2001)

The Hand-over-Mouth (HOM) exercise has been proposed as a behavior management tool for communicative, but defiant children.<sup>1</sup> The restraint technique sought to establish a line of communication and clear understanding of expected behaviors from the child patient.<sup>2</sup> Davis and Rombom, in a 1979 survey of educational directors of advanced programs in pediatric dentistry, reported wide acceptance of HOM but with less acceptance of a variant technique.<sup>3</sup> That variant technique, Hand-over-Mouth with Airway Restraint (HOMAR), was reportedly utilized by only 31% of the reporting program directors, whereas HOM was employed in 89% of the programs. Restraint devices were reported to be employed in 67% of the programs as an acceptable behavior management tool.

Subsequent to Davis and Rombom's survey, considerable attention was directed toward the use of restraint techniques, including HOM and HOMAR. Although the widespread use

of such techniques within educational programs was interpreted as reflecting professional acceptance, such professional standards were questioned as potentially conflicting with community standards, individual rights, and expectations.<sup>4</sup> The greatest conflict between professional and community standards had been expressed in cases where legal or criminal proceedings were initiated over the use of restraint techniques, such as HOM.<sup>5</sup>

Studies evaluating parental acceptance of various behavioral techniques indicated that acceptance could be modified through appropriate information regarding the use of such techniques.<sup>6,7</sup> Among the various techniques, there was a reported hierarchy of acceptance, with positive techniques being more widely accepted than aversive techniques. Despite the ability to increase acceptance of behavioral techniques by communication with parents, all techniques were subject to disapproval by a portion of parents.<sup>8</sup>

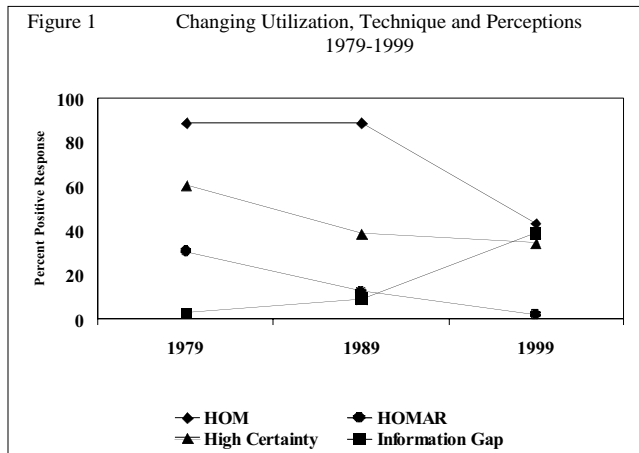
In 1988, following a program directors' meeting on behavior management, the American Academy of Pediatric Dentistry promulgated guidelines for the use of various behavior management techniques and has periodically revised those guidelines.<sup>9,10</sup> Among the many important issues in the use of behavioral techniques which may be considered by a reasonable parent is the need to obtain informed consent prior to the use of any potentially objectionable technique.<sup>11,12</sup> Fields et al indicated that restraint devices and HOM were never viewed as justifiable techniques by a majority of parents, underscoring the need for informed consent.<sup>8</sup>

The need for parental involvement in the decision to utilize a specific behavioral technique, such as restraint, is required even though courts have considered restraint a proper modality for health care when an appropriately documented decision to utilize it is made by a physician or a dentist.<sup>13</sup>

Although the desired outcome for patients in acute care is generally a cure or improvement of health through the use of sophisticated diagnostic and treatment measures, the decision to use restraint may be appropriate in some situations but not in others, and requires the parent to consider burden versus benefit.<sup>14</sup>

A decade after Davis and Rombom's survey, an identical survey was sent to directors of advanced educational programs in pediatric dentistry. During the intervening period of time, there was no decrease in the reported use of HOM. However, there was significantly reduced acceptance of HOMAR.<sup>15</sup> Al-

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though there was not a readily apparent decrease in the acceptance of HOM among advanced educational programs in pediatric dentistry, there were some differences noted on the basis of the length of tenure of the program director. Those with more than 10 years of tenure were most likely to use HOMAR and most likely to eliminate the communication component of HOM, in their application of the technique. In turn, such senior directors were significantly more likely to be certain that HOM was devoid of psychological sequelae. Perhaps most striking, however, was the discovery that the 11% of the program directors that reported never using HOM all had less than 10 years tenure.

The association between length of experience and utilization of behavior management techniques was also noted in a 1999 survey of regional practices. Individuals with more lengthy experience were reportedly more likely to continue the use of techniques such as HOM and HOMAR.<sup>16</sup>

The aim of this study was to compare current responses from directors of advanced educational programs in pediatric dentistry regarding the use of HOM and restraint in their programs to those obtained in the past 20 years, utilizing the Davis and Rombom survey tool.

## Methods

Program directors of accredited advanced educational programs in pediatric dentistry were mailed a survey tool seeking to assess their current teaching and use of restraint techniques. The survey was identical to the tool initially used by Davis and Rombom and then re-used by Acs and Burke a decade later. A second mailing was directed toward non-responders. No additional attempts or methods were employed in order to increase compliance with the study request.

The results of the current survey were then compared to those from these two previous investigations, representing a span of 20 years. Chi-square analysis was performed on all the data to detect significant changes in the use of or rationale for restraint in pediatric dentistry. Where detailed data and responses were available for comparison, such as between the 1989 and 1999 surveys, McNemar testing was performed in order to determine whether individual programs or individual respondents exhibited any changed patterns of use or belief regarding restraint techniques.

The length of tenure as a program director, as well as the number of years since graduation from an advanced educational program in pediatric dentistry, were assessed to determine any potential association with the responses regarding restraint use.

## Results

Surveys were returned by 46 (87%) of the 53 solicited program directors. In 1989, 54 (96%) of the 56 program directors replied, while only 36 of 62 directors (58%) responded to the 1979 survey. Both the current survey and the 1989 survey represented significantly greater rates of return than the initial survey ( $P < 0.001$ ).

### Situations in which HOM is employed (Table 1)

Significantly more program directors currently stated that they never employed HOM, as compared to previous years ( $P < 0.0001$ ). The reported incidence of its use in programs fell from 89% in both 1979 and 1989 to 44% in the current survey year (Fig 1).

The most common indication for its use in patients exhibiting hysterical or tantrum like behavior reflected the majority of the decline ( $P < 0.0001$ ). A small, yet declining use of HOM in unspecified "other situations" was also reported when compared to 1989.

### Description of the technique as recommended (Table 2)

While 80% of the 1989 respondents reported a technique that included informing the child of the reason for the use of the hand and their expected behaviors, only 52% of the 1999 respondents did so ( $P < 0.005$ ). However, further analyses of the two groups on the basis of whether the respondents used HOM indicated the source of the technique difference. Directors that reported the use of HOM were significantly more likely to also inform the child of why the hand was used and what the outcome behaviors were expected ( $P < 0.00001$ ), whereas non-users were more likely to report that the recommended technique did not include concomitant verbal instructions and communication of behavioral expectations.

The percentage difference between those reporting that the technique involved both covering the mouth and informing the child of the reasons for its use and expected behaviors was 4% and 5% for HOM users in 1989 and 1999, respectively. However, among HOM non-users, the differences were 50% and 65%. Program directors reporting that they never used HOM in their programs were significantly less likely to believe that informing the child of the reasons for the hand use and expected behaviors was part of the recommended HOM technique.

The omission in technique represents an "information gap" that grew from 1979 to 1999 (Fig 1). The difference in technique between users and non-users was statistically significant for both the 1989 and 1999 groups ( $P < 0.01$  and  $P < 0.0001$ , respectively; (Fig 2).

In the current survey, a single program director reported the use of HOMAR, whereas previous surveys indicated its use more frequently. The overall use of HOMAR is significantly reduced since 1979 ( $P < 0.001$ , Fig 1).

### Situations where restraint techniques are recommended

The previously reported increase in the use of restraint devices between the 1979 and 1989 respondents was not replicated in the 1989 and 1999 comparisons. The reported use of such devices for premedicated, physically resistive, or handicapped patients remained stable. However, whereas 85% of the 1989 group reported use of such devices, only 72% and 53% of the 1999 and 1979 groups, respectively, did so.

**Table 1. Situations in Which HOM is Employed**

	1979 Overall (%)	1989 Overall (%)	1989 (%) Among reported HOM users	1999 Overall (%)	1999 (%) Among reported HOM users
Hysterical, tantrum behavior	30 (83)	43 (80)	43 (90)	19 (41)*	19 (95)
Never used	4 (11)	6 (11)	NA	26 (57)*	NA
Other	2 (6)	5 (9)	5 (10)	1 (2)	1 (5)
Total reporting HOM use	32 (89)	48 (89)	NA	20 (44)*	NA

\*P < 0.0001

There were no differences in the perceived indications for restraint device use based upon whether the respondents indicated acceptance of the HOM technique.

**Psychological problems induced by restraint techniques**

The 1999 respondents continued a trend of decreasing certainty that HOM and restraint techniques were free of anticipated psychological sequelae for the child (Fig 1). The difference between the 1989 and 1999 groups, however, was not significant, although both of those groups were significantly less certain that such techniques were free of psychological sequelae than was the 1979 cohort. Whereas 61% of the 1979 program directors were highly certain that no psychological problems were induced by restraint techniques, only 39% and 35% of the 1989 and 1999 respondents expressed such certainty.

There were no differences noted between the 1989 and 1999 groups on the basis of whether they reported acceptance of the HOM technique (Fig 2).

**Directors' length of tenure**

The mean length of tenure as a program director was 8 years among 1989 respondents and 11 years in 1999 (*P* < 0.05); 22% of the 1999 respondents reported more than 20 years directorship experience, compared to only 6% of the 1989 group (*P* < 0.05). There were no differences in any of the outcome measures among the 1999 respondents on the basis of more than 10 years tenure as a program director.

**Directors' educational experience**

Ninety-six percent of the 1999 respondents reported that they received training in the use of HOM, whereas only 61% received training in the use of HOMAR. There were no differences based upon whether the respondent received training in the use of HOMAR.

**Changing patterns of indications for its use, use, and recommended techniques (Table 3)**

Thirty-nine programs responded to both the 1989 and 1999 surveys. Significant changes in philosophy regarding the use of HOM were observed in the following: decreased acceptance of HOM as a technique employed in the management of hysterical behavior; increasing likelihood of complete elimination of HOM as a behavioral management tool; and, decreasing reliance on concomitant communication with the child, providing reasons for the use of the hand and the child's expected behaviors.

Fifteen program directors responded to both the 1989 and 1999 surveys. Of those responding to both surveys, significant changes were noted as reflected in: decreased acceptance of HOM use in managing hysterical behavior, increasing elimination of HOM as a behavioral tool and a decreasing tendency to cover only the mouth.

The gap between the percentage reporting that the technique involved both covering the mouth and informing the child of the reasons for its use and expected behaviors was 5% and 3% among programs, in 1989 and 1999, respectively. However, among previously responding program directors, the differences were 20% and 7% .

**Table 2. Description of Technique as Recommended**

	1979 (%) Overall responses	1989 (%) Among reported HOM users	1989 (%) Among reported HOM non-users	1999 (%) Among reported HOM users	1999 (%) Among reported HOM non-users
Cover mouth only	25 (70)	43 (90)	5 (83)	18 (90)	24 (92)
Cover mouth and nose	11 (31)	6 (13)	0 (0)	1 (5)**	0 (0)
Inform child of why hand is used and expected behavior	24 (67)	41 (85)	2 (33)*	17 (85)	7 (27)***
Give verbal directions only regarding expectations	11 (31)	10 (21)	1 (17)	5 (25)	3 (12)
Give no verbal directions regarding expected behavior	1 (3)	0 (0)	0 (0)	2 (10)	0 (0)

\*P < 0.05, Fisher Exact Probability Test (1989 HOM users versus non-users)

\*\*P < 0.001, Fisher Exact Probability Test (1999 versus 1979 and 1989)

\*\*\*P < 0.0001, chi square = 20.1 (1999 HOM users versus non-users)

## Discussion

Davis and Rombom's survey on HOM and restraint was at a time when HOM had wide acceptance in pediatric dentistry educational programs, and among the general membership.<sup>17</sup> Pinkham believed that the behavioral aspects of pediatric dentistry were not immune to the changing realities that confronted the American child in fast and dramatic fashion since the late 1960s.<sup>18</sup> In the time between the original survey and its initial followup, much had occurred to create controversy surrounding HOM, including conflicts between professional and community standards.<sup>4,5</sup>

In pragmatic terms, Schuman believed that the role of dentists as guardians of health and well being was challenged by civil and criminal actions taken against practitioners engaged in conventional practice.<sup>5</sup> The dichotomy between these spheres of interest confirmed the need to heed Chambers' call for "clear professional standards for appropriate child dental behavior."<sup>19</sup>

HOMAR, which appeared to have limited support among educational programs in 1979, had significantly less support in 1989, and subsequently had its use contraindicated.<sup>10</sup> The extent of its use, however, may have been under-reported in the initial survey, since study compliance was low. In the current survey, 22 different programs were represented by directors who completed their pediatric dentistry training after the 1979 survey. Surprisingly, 64% of those programs provided training in HOMAR, based upon responses of current directors who had graduated from those programs, compared to the 31% reported by Davis and Rombom. This discrepancy between the reported acceptance of HOMAR and actual use, may be related to an uneasiness about disclosing its use. This level of unease may also be noted in the manner in which the AAPD behavior management guidelines avoided direct reference to HOMAR, alluding only to a contraindication to the HOM technique "when it will prevent the child from breathing."<sup>10</sup>

The acceptance of HOM among program directors did not wane in a similar fashion to HOMAR during the 1979 to 1989 period, despite the significant decrease of certainty that its use was free of psychological sequelae. The reported use of HOM, unlike HOMAR, appeared to accurately reflect the technique's acceptance in 1979, and was unchanged in the 1989 survey. The large decrease in the use of HOM between 1989 and 1999, however, appears to reflect a similar, albeit delayed, shift away from a technique that previously had strong professional support.

Although the decrease in certainty that restraint techniques were free of psychological sequelae was significant between the initial two surveys, that continuing trend in the current survey did not reflect significant change from the previous decade. 1999 respondents continued to be less firm in their conviction that such techniques were free of psychological sequelae and were more likely to believe that "fear of dentistry" could be induced.

Although the decrease in certainty was not significant, the passage of time appears to have strengthened the existing uncertainty, as reflected in a significant drop in the number of programs teaching HOM. This is consistent with the prediction that decreased conviction of the benign nature of HOM and restraint expressed in the 1989 survey was a harbinger of changing patterns of use within postdoctoral programs.<sup>15</sup> The controversy surrounding the downstream effects of HOM have certainly not been resolved. Although Barton et al have concluded that HOM has no longterm adverse sequelae,<sup>20</sup> Milgrom et al believed that loss of control, as may be embodied in restraint techniques, may be associated with subsequent adolescent dental fears and avoidance behaviors.<sup>21</sup>

With the average program director having finished postdoctoral training in 1979, it is not surprising that 96% of all the respondent program directors reported having received training in HOM. However, as opposed to the comparisons between the 1979 and 1989 groups of program directors, length of tenure does not appear to currently place a program director at risk for inability to respond to changing professional and materiality standards. In fact, among the 10 program directors with 20 or more years of experience, half no longer reported using HOM technique in their programs. All of these individuals received training in HOM, and 70% received training in HOMAR. Similar changes were seen among individuals that have been in a directors' position between 11 and 20 years.

Although the changes exhibited by the directors was not as pronounced as those reflected on the program level, significant changes occurred, nonetheless. One may speculate that the change occurred in response to evolving societal standards or external forces. However, the change observed among half of these more experienced directors may be consistent with McKnight-Hanes' observation that the peak use of HOM was observed in 40-49 year old practitioners, while those 50 years or older exhibited the lowest use of HOM.<sup>22</sup>

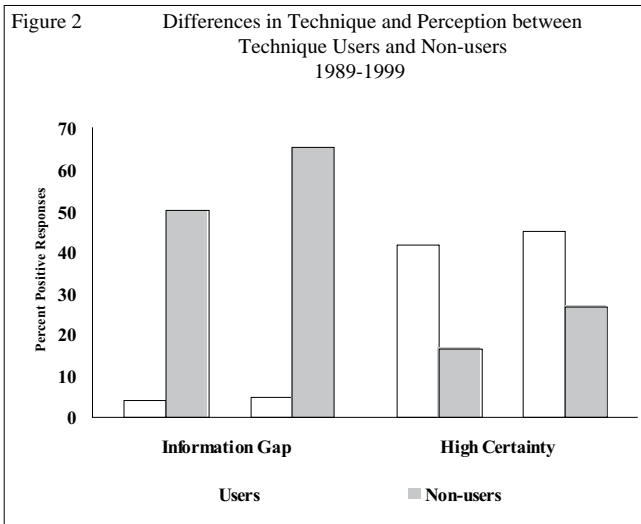
Individuals responding to both the 1989 and 1999 surveys also demonstrated changes in their acceptance of the HOM

**Table 3. OM: Changing Patterns of Indications for its Use, Use and Recommended Techniques**

	Hysterical, tantrum behavior		HOM never used		Cover mouth only		Inform child and expected behavior	
	% Acceptance of indication for use		% reporting that HOM was never used		% reporting imited technique		% reporting adjunct to technique	
	1989	1999	1989	1999	1989	1999	1989	1999
Program specific (N=39)	77	44***	10	54†	85	54*	80	51**
Program director specific (N=15)	93	47**	7	53**	93	47**	73	40 (NS)

Percent of programs or program directors indicating changed responses between 1989 and 1999.

\* P < 0.02 \*\* P < 0.03 \*\*\*P < 0.004 † P < 0.001



technique. Half of those reporting its use in 1989 no longer accepted the technique. Additionally, the technique information gap as recommended by these individuals diminished by 67%. Although the gap was larger than that existing among programs responding to both the 1989 and 1999 surveys, that were now led by individuals having more recently completed their advanced education, the difference had narrowed considerably.

Previous training in HOMAR did not seem to predispose an individual toward maintaining use of HOM. Forty-three percent of the individuals receiving training in HOMAR currently accepted HOM, while 44% of those not trained in HOMAR accepted HOM. With the unexpected finding that a single program still reported the use of HOMAR, it is a technique that was abandoned a decade ago. However, its continued teaching was noted by another program director who graduated in the past decade from a program other than the one currently reporting its use.

The decreased teaching of HOM, as well as the decreasing use of restraint devices for very young children may be reflected in changing patterns of use of behavior management techniques in practice, including recently reported decreased use of HOM and sedation while the use of general anesthesia increased.<sup>16</sup> As profession leaders, one would expect educational program directors to establish a tone for practice and have particular impact upon their region and recent graduates. Such may be the case, as expressed in the regional survey, indicating different patterns of behavior management utilization based upon length of practice, with more experienced practitioners more likely to utilize HOM.

The trend described by Carr et al is consistent with the prediction made a decade ago that viewed such changing patterns as a consequence of the deterioration of the hierarchy of behavior management tools.<sup>23</sup>

Of some concern is the information gap noted among respondents regarding the components of the HOM technique. AAPD guidelines recommend that the child be informed of the reason for hand use, as well as the expected behavioral outcomes that would cease the use of the hand. Individuals that reported use of HOM were significantly more likely to describe the technique as including the communication component, than were non-users.

Among the myriad of reasons that the HOM technique may be losing adherents, is its diminished efficacy as the technique may be compromised by partial implementation. A restraint technique that is devoid of communication and the establishment of behavioral objectives may not provide the anticipated results. Additionally, if the child or parent views HOM as an arbitrary exercise of power, rather than as a reasoned action, there may, in fact, be psychological sequelae associated with its use, including the fear of dentistry or a misunderstanding of the intent behind the action.

The promulgation of behavior management guidelines was intended to provide a blueprint for clinical action. However, the "information gap" seems to indicate inconsistent adherence to guidelines. Casammasimo observed that in the hands of a skilled clinician HOM is an impressive technique. However, when misused or in desperation, it is "downright ugly."<sup>24</sup> The indication that at least two programs in the past decade continued use of HOMAR is disturbing. Although Chambers' early call for standards in behavior management has been answered, there is not yet certainty that such standards will be followed.

In the case of HOMAR, it appears as if advanced educational programs have been in the lead in decreasing its use. In 1979, 31% of the programs used HOMAR, while a concurrent survey of the membership revealed that 54% used the technique.<sup>17</sup> A decade later, 11% of programs reported utilizing HOMAR, compared to 20% of the membership.<sup>25</sup> Certainly the virtual disappearance in the use of HOMAR among advanced educational programs is encouraging and, once again, appears to be leading the trend, since the regional survey indicated that 10% of practicing pediatric dentists, predominantly more senior practitioners, continued to employ HOMAR.<sup>16</sup> Their utilization of HOM, however, was reported to be 44%, very similar to that reported in the current program directors' survey.

For programs continuing to teach HOM, it is encouraging that the technique gap is small and the technique, as originally envisioned, is presented to a new generation of practitioners, who may make informed decisions regarding its use in clinical practice.

## Conclusions

1. There has been a significant decrease in the number of advanced educational programs in pediatric dentistry currently teaching the HOM technique in the past 10 years;
2. Program directors continuing to report use of HOM are significantly more likely to report a technique that encourages communication with the child, consistent with the technique outlined in AAPD guidelines, as compared to non-users; and
3. Significant numbers of programs and program directors who previously reported acceptance of HOM no longer do so.

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## ABSTRACT OF THE SCIENTIFIC LITERATURE



### Technique sensitivity of dentin bonding

The objective of this *in vitro* study was to evaluate dentin bond strength and marginal adaptation of direct composite resins used according to manufacturer's instructions, or with simulated application errors. A composite resin was bonded to the dentin of freshly extracted third molars with one of the following dentin bonding systems: Syntac Classic, Scotchbond Multi-Purpose, or Prime & Bond 2.1. Simulated application errors were: prolonged etching time, excessive drying after etching, drying primers immediately after application, or drying primers excessively. All application errors caused a dramatic decrease in the performance of all dentin bonding systems evaluated, as measured by bond strength and marginal adaptation.

**Comments:** This study demonstrates that strict adherence to the manufacturer's protocols is necessary for successful bonding to dentin. Mistakes in the technique for dentin bonding resulted in dramatically lower bond strengths and higher incidence of marginal gaps in composite resin restorations. JN

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