CLINICAL EVALUATION OF AN ADHESIVE SEALANT FOR CONTROLLING DENTAL CARIES IN NAVAL PERSONNEL:

ONE-YEAR RESULTS

by

George T. Eden, CDR, DC, USN
and
M.A. Mazzarella, CAPT, DC, USN

Released by:

R.L. Sphar, CDR, MC, USN
Officer-in-Charge
Naval Submarine Medical Research Laboratory

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Reviewed and Approved by:

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SCIENTIFIC DIRECTOR
NavSubMedRschLab

OFFICER IN CHARGE
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THE PROBLEM

To ascertain the effectiveness of an adhesive type sealant material in reducing the incidence of dental caries in Naval personnel, with a view to including treatment with this type of material, should it prove effective, in the Navy's Preventive Dentistry Program. Such polymeric pit and fissure sealants have been reported as highly effective in reducing occlusal caries in children.

FINDINGS

a. Results tabulated after one year of using this sealant material on 111 subjects showed no reduction in the occlusal caries attack rate.

b. The very low occlusal caries attack rate of 1.67% for one year in 660 control teeth indicates that sealant application would not be cost effective in the young adult population which makes up the U.S. Navy, regardless of the caries prevention potential of the sealant.

APPLICATION

Analysis of the data at the end of the first year of this study strongly suggests that sealant application is ineffective in preventing new occlusal caries in young male adults and provides sufficient evidence to discourage the use of such a sealant on active duty personnel.

ADMINISTRATIVE INFORMATION

This investigation was conducted as part of Bureau of Medicine and Surgery Research Work Unit MF51.524-012-0020 - Evaluation of Polymeric Pit and Fissure Sealants as a Dental Decay Preventive in Submarine Personnel. The present report is Number One on this Work Unit. It was submitted for review on 8 August 1974, approved for publication on 20 August 1974, and designated as NavSubMedRschLab Report No. 732.
ABSTRACT

A polymeric pit and fissure sealant reported effective in preventing occlusal dental decay in children was evaluated in 111 young men who were candidates for entrance into the Naval Submarine School.

The sealant application had not shown any measurable treatment effect in the study population at the end of the first year of this two-year study.

The very low occlusal attack rate for untreated control teeth (1.67% for one year) strongly suggests that sealant application, regardless of treatment effect, would not be a cost effective measure in active duty Navy personnel.

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CLINICAL EVALUATION OF AN ADHESIVE SEALANT FOR CONTROLLING DENTAL CARIES IN NAVAL PERSONNEL:

ONE-YEAR RESULTS

INTRODUCTION

A significant reduction in the rate of new caries formation followed implementation of the Navy's three-agent stannous fluoride program. The caries inhibiting effect of both dietary and topical fluoride is concentrated on smooth enamel surfaces, however, and provides relatively less protection to the fissured chewing surfaces of the posterior teeth. The identification of a complementary measure which would result in material reductions in new occlusal caries would extend the value of the Navy's Preventive Dentistry Program.

Buonocore in 1955 reported an acid modification of dental enamel which promoted adhesion of polymethylmethacrylate (PMMA) filling resin to the tooth surface. A modification of this acid-etch technique, used in conjunction with the dimethacrylate monomer (Bis-GMA), developed by Bowen, has found wide use in the sealing of occlusal pits and fissures as a decay preventive measure in youthful patients.

The dramatic reduction in occlusal decay for children reported by Buonocore (up to 99% reduction in occlusal decay for two years) and others following one application of sealant is of obvious interest to the U.S. Navy which is composed primarily of young adults whose dental care needs are presumably related to those of adolescents.

To establish the desirability of conducting a sealant trial in Naval personnel 18-22 years of age, two young Navy populations were surveyed to determine whether the need for occlusal surface protection did indeed exist, and also to assist the investigator in preparing the protocol for a sealant evaluation.

In September-October 1971, 263 consecutive Submarine School candidates at the Naval Submarine Base New London, Groton, Connecticut, were examined and the number of occlusal surfaces at risk (occlusal surface caries free, no occlusal fillings, no proximal decay) was determined. Considering 1st, 2nd, 3rd molars and 1st, 2nd bicuspids (20 teeth/man) the 263 examinees had a total possible 5260 occlusal surfaces. Of these 5260 occlusal surfaces, 2014 were caries-free with no occlusal fillings and in teeth with no proximal decay so that 38.3% of all possible posterior teeth were at risk to occlusal caries and would conceivably benefit from sealant application. The average number of occlusal surfaces at risk per man was 7.6 and the modal number at risk per man was 6.0. The actual proportion of posterior teeth at risk in fact would be somewhat higher because of the above figures were not corrected for extracted teeth or unerupted 3rd molars.

A larger survey was conducted in October 1971 on 1000 consecutive
recruits by Commander James Klima at
the Naval Training Center, Great Lakes,
Illinois, to confirm the results of the
New London survey and to provide a
more reliable estimate of the number of
occlusal surfaces at risk per man
among a broad cross-section of newly
enlisted personnel. The results shown
in Table I mirror the New London
survey in that 39.3% of all possible
occlusal surfaces were at risk with an
average number of 7.9 occlusal sur-
faces at risk per man. Factoring out
1280 unerupted 3rd molars from the
20,000 possible occlusal surfaces
increases the best estimate of oc-
clusal surfaces at risk to 42.0%. As
in the New London survey, this fig-
ure (42%) still underestimates the
real proportion of surfaces at risk
because the total of possible occlusal
surfaces was not further reduced by
the number of extracted posterior
teeth.

MATERIALS AND METHODS

Two hundred ninety-nine (299) Sub-
marine School candidates (ages 17-23)
with 1794 pairs of noncarious posterior
teeth were chosen as subjects for the
sealant evaluation. Participation in the
study was voluntary and each subject
was informed orally and in writing of
sealant development, its possible
benefits, and the pertinent elements of
his participation in the current study.

Since the use of homologous, con-
tralateral pairs ensures that variation
due to oral environment, mechanical
stress, and other undefined sources of
experimental error will be minimized,
the distribution of suitable caries-free
occlusal pairs was determined for the
New London group. The experimental
design involving matched pairs has been
employed by Buonocore, Richardson, and Horowitz in sealant studies and is
based primarily on the symmetry of
carious involvement within individual
mouths. For this particular study,
it was decided that each participant
should have at least one pair of caries
free 1st or 2nd molars. Twenty-six
per cent of the examinees (69 of 263)
met this minimum criterion.

Only noncarious teeth were chosen
for the study. Teeth patently decayed
were excluded. Teeth with deep
grooves, discolorations, or explorer
catches were not excluded, but teeth
with occlusal pits and fissures which
felt soft at their base, elicited pain
from the subject when probed, resisted
withdrawal of the explorer tine, or with
enamel whose light-refractive qualities
were significantly altered through
decalciﬁcation were excluded. Starlite
23 explorers, examined under a 30
power binocular microscope for con-
sistency of point taper and wear, bite-
ing x-rays, and the investigator’s
extensive experience in operative
dentistry were the final elements in
determining tooth eligibility.

No attempt was made to further sub-
classify noncarious occlusal surfaces
as to probable susceptibility, although
the subjects’ prior decay experience
was noted by recording Decayed,
Missing, Filled Teeth (DMFT) and
Decayed, Missing, Filled Surfaces
(DMFS) at the time of sealant placement.

The sealant chosen for evaluation was
Caulk Nuva-Seal*. Nationally advertised

*L.D. Caulk Corp., Milford, Delaware
TABLE I - CARIES DATA FOR 1,000 CONSECUTIVE NAVY RECRUITS AT GREAT LAKES RECRUIT TRAINING CENTER - OCTOBER 1971

<table>
<thead>
<tr>
<th></th>
<th>Sound occlusal</th>
<th>Carious occlusal</th>
<th>Carious proximal or unerupted</th>
<th>Partially or total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Upper Molars</td>
<td>1493</td>
<td>640</td>
<td>822</td>
<td>422</td>
</tr>
<tr>
<td>Lower Molars</td>
<td>1287</td>
<td>549</td>
<td>836</td>
<td>858</td>
</tr>
<tr>
<td>All Molar</td>
<td>2780</td>
<td>1189</td>
<td>1658</td>
<td>1280</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>Sound occlusal</th>
<th>Carious occlusal</th>
<th>Carious proximal or unerupted</th>
<th>Partially or total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Upper Bicuspid</td>
<td>2278</td>
<td>69</td>
<td>856</td>
<td>-</td>
</tr>
<tr>
<td>Lower Bicuspid</td>
<td>2801</td>
<td>93</td>
<td>474</td>
<td>-</td>
</tr>
<tr>
<td>All Bicuspid</td>
<td>5079</td>
<td>162</td>
<td>1330</td>
<td></td>
</tr>
</tbody>
</table>

Total possible occlusal surfaces/man (U/L 1st, 2nd bicuspid; 1st, 2nd, 3rd molar) = 20.

Total possible occlusal surfaces in 1,000 recruits. 20 x 1,000 = 20,000.

Total observed occlusal surfaces at risk 7,859; 7.86/man.
(No occlusal fillings, no occlusal or proximal caries)

% occlusal surfaces at risk \(\frac{7859}{20000} = 39.3\%\)

(a) % occlusal surfaces at risk adjusted \(\frac{7859}{18720} = 42.0\%\) for unerupted 3rd molars
material purchased through commercial sources was used initially and then replaced by the commercial formulation with 0.07% by weight FD+C #17 Red Dye added to assist in visualizing the transparent sealant. This dyed formulation which has been used in studies by Going, Swartz, and Harris was furnished by the L.D. Caulk Corporation. The sealant was placed in accordance with the manufacturer's directions. Additional safeguards were employed in that a voltage monitoring strip chart recorder was employed during sealant placement to ensure continuous delivery of adequate voltage to the ultraviolet light source (Nuva-Lite)* used for sealant polymerization. Also, a new air compressor** with suitable characteristics was installed to permit confidence in meeting the requirements for moisture- and oil-free air necessary to dry the tooth surfaces for maximum wetting by the polymer with penetration of surface irregularities and effective bonding.

Prior to sealant placement, each subject was supplied with a soft multitufted nylon toothbrush and one ounce of unflavored flour of pumice with water added to produce a thick slurry. Subjects were instructed to scrub their occlusal surface using one minute and one quarter of the pumice for each quadrant. Starting in the upper arch, one tooth of the most posterior eligible tooth pair was sealed using cotton rolls for isolation. (Right or left quadrant for the first sealed tooth was decided for the first patient each day by a coin toss). The arch was crossed for each successive sealed tooth to aid in confounding intrasubject masticatory bias. Each successive patient for the day was begun with the first sealed tooth on the side opposite the beginning side for the previous patient. Following placement of the sealant, occlusion was adjusted to achieve group function with only a slight opening of the bite that the patient felt he could tolerate while milling in. Contacts were then checked with dental floss, any sealant in the interproximal area was removed, and the subject was released.

Re-examinations were conducted as subjects became available in New London or in the home ports to which subjects were transferred in other Naval Districts following their graduation from the Naval Submarine School. All re-examinations were conducted by the principal investigator. The nominal interval for re-examinations was six months, with the last examination intended at two years. Appropriate class indicators were used to group examination data at the 6 month, 12 month, and 18 month points.

Criteria for caries assessment on re-examination were those used in selecting subjects, except that a sealed tooth with sealant intact was assumed noncarious and those study teeth (sealant or control) found to have restorations upon re-examination were assumed to have been carious. Sealant retention was judged subjectively as (a) Intact (no significant wear); (b) Intact but worn (significant wear has occurred, but all pits and fissures were still coated); (c) Partially intact (at least a

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*L. D. Caulk Corp., Milford, Delaware
**Air Techniques, Oil-less Compresso-Dri, Model ABT, Air Techniques, Inc. 2020 Jericho Turnpike, New Hyde Park, New York.
portion of the pits, fissures, and grooves were still coated while some of these vulnerable areas were now exposed through sealant loss); and (d) Sealant lost (all sealant lost or only isolated tags remained on inclined planes or other "clean" areas of the occlusal surface).

RESULTS

A total of 20 teeth (9 sealant treated, 11 controls) of 1320 study teeth in 111 subjects were found to be carious (Table II). The average time of service to date, calculated by combining the 6 month, 12 month, and 18 month groups was one year, and the overall occlusal caries attack rate for this period was 1.52% (1.67% control; 1.36% sealant).

Table III shows that the mean DMFT score of all subjects was 5.6 and their mean age was 21.6 years at the time of sealant placement. Mean DMFS score was 7.2 and 51 unrestored carious lesions were present.

Retention data for the clear and the tinted material differed greatly (Table IV). "Complete retention" was assigned to those coatings judged (a) intact and (b) intact but worn. "At least partial retention" was defined as a combination of (a) and (b) above with (c) partially intact. "Sealant lost" (d) has been described above.

"Complete retention" was noted for the tinted sealant in 57.6% of 238 teeth at 12 months and 41.3% of 63 teeth at 18 months. "Complete retention" for the clear sealant was 91.8% of 98 teeth at 12 months and 92.4% of 105 teeth at 18 months. "At least partial retention" was noted for the tinted sealant in 76.4% of 238 teeth at 12 months and 68.3% of 63 teeth at 18 months. "At least partial retention" for the clear sealant was 99% of 98 teeth at 12 months and 95.2% of 105 teeth at 18 months.

The hypothesis that the tinted and clear sealants did not differ in duration of retention was tested by Chi square analysis for both the 12 month and 18 month data (Table V). Extremely significant differences (.005 level) were found in each case. Retention of the clear sealant was markedly superior.

The accelerated loss rate of tinted sealant relative to clear sealant can be seen in the proportion of teeth with "sealant lost" at 6, 12, and 18 month evaluations. Tinted sealant loss was 17% at 6 months, 24% at 12 months, and 32% at 18 months while clear sealant loss was only 1.0% at 12 months and 5% at 18 months. No data is available for clear sealant at 6 months.

Table VI itemizes the new occlusal caries by location. The bicuspid which constituted 57.06% of the 1320 study
TABLE III - SUBJECT DATA AT TIME OF SEALANT PLACEMENT

<table>
<thead>
<tr>
<th>Age Group</th>
<th>Subjects</th>
<th>Pairs</th>
<th>Surfaces Carious</th>
<th>DMF Surfaces</th>
<th>Mean DMFS</th>
<th>Mean DMFT</th>
<th>Mean Age</th>
</tr>
</thead>
<tbody>
<tr>
<td>6 months tinted</td>
<td>25</td>
<td>156</td>
<td>7</td>
<td>125</td>
<td>5.0</td>
<td>2.7</td>
<td>20.85</td>
</tr>
<tr>
<td>12 months tinted</td>
<td>41</td>
<td>238</td>
<td>38</td>
<td>300</td>
<td>7.3</td>
<td>8.6</td>
<td>21.83</td>
</tr>
<tr>
<td>18 months tinted</td>
<td>11</td>
<td>63</td>
<td>0</td>
<td>71</td>
<td>6.5</td>
<td>4.4</td>
<td>22.07</td>
</tr>
<tr>
<td>All tinted</td>
<td>77</td>
<td>457</td>
<td>45</td>
<td>496</td>
<td>6.4</td>
<td>6.1</td>
<td>21.58</td>
</tr>
<tr>
<td>12 month clear</td>
<td>16</td>
<td>98</td>
<td>5</td>
<td>164</td>
<td>10.3</td>
<td>4.8</td>
<td>22.09</td>
</tr>
<tr>
<td>18 months clear</td>
<td>18</td>
<td>105</td>
<td>1</td>
<td>144</td>
<td>8.0</td>
<td>4.6</td>
<td>21.41</td>
</tr>
<tr>
<td>All clear</td>
<td>34</td>
<td>203</td>
<td>6</td>
<td>308</td>
<td>9.1</td>
<td>4.7</td>
<td>21.73</td>
</tr>
<tr>
<td>All subjects</td>
<td>111</td>
<td>660</td>
<td>51</td>
<td>804</td>
<td>7.2</td>
<td>5.6</td>
<td>21.63</td>
</tr>
</tbody>
</table>

Mean Age 21.63 years (n = 103); ages of 8 subjects not recorded.
Std. dev. 1.79 years.

teeth contributed only one carious occlusal surface for a caries attack rate of 0.13%. First molars which constituted 17.83% of the study teeth had an occlusal caries attack rate of 1.69%. Second molars which constituted 20.03% of the study teeth had an occlusal caries attack rate of 3.03%. The much more recently erupted 3rd molars which constituted only 5% of the study teeth had an attack rate of 10.46%.

DISCUSSION

Two important inferences can be drawn from the data gathered to date:

1. The occlusal carries attack rate of 1.67% for control teeth in this study is far less than the one year caries attack rates of 9.5% to 47% reported by Pollard, Going, and Buonocore in younger patients.

2. This occlusal sealant in this population offered no discernible treatment effect.

The high caries attack rate, soon after eruption, for occlusal surfaces of posterior teeth has been documented by Dirks, Reid, and Carlos. The very early involvement of posterior occlusal surfaces in the carious process...
TABLE IV - SEALANT RETENTION WITH TIME (FOR CLEAR AND TINTED)

<table>
<thead>
<tr>
<th>SUBJECTS</th>
<th>TINTED SEALANT</th>
<th>CLEAR SEALANT</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>6 months</td>
<td>12 months</td>
</tr>
<tr>
<td></td>
<td>Total pairs -</td>
<td>Total pairs -</td>
</tr>
<tr>
<td>25</td>
<td>156</td>
<td>238</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Intact</td>
<td>80</td>
</tr>
<tr>
<td></td>
<td>Complete</td>
<td>At least</td>
</tr>
<tr>
<td></td>
<td>retention</td>
<td>partial</td>
</tr>
<tr>
<td></td>
<td>68%</td>
<td>83%</td>
</tr>
<tr>
<td></td>
<td>Intact but worn</td>
<td>27</td>
</tr>
<tr>
<td></td>
<td>Lost</td>
<td>23</td>
</tr>
<tr>
<td></td>
<td>17%</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Partially intact</td>
<td>26</td>
</tr>
<tr>
<td></td>
<td>Lost</td>
<td>17%</td>
</tr>
<tr>
<td>41</td>
<td>12 months</td>
<td>12 months</td>
</tr>
<tr>
<td>11</td>
<td>18 months</td>
<td>18 months</td>
</tr>
<tr>
<td></td>
<td>Total pairs -</td>
<td>Total pairs -</td>
</tr>
<tr>
<td></td>
<td>98</td>
<td>105</td>
</tr>
<tr>
<td></td>
<td>Intact</td>
<td>79</td>
</tr>
<tr>
<td></td>
<td>Complete</td>
<td>At least</td>
</tr>
<tr>
<td></td>
<td>retention</td>
<td>partial</td>
</tr>
<tr>
<td></td>
<td>92%</td>
<td>99%</td>
</tr>
<tr>
<td></td>
<td>Intact but worn</td>
<td>11</td>
</tr>
<tr>
<td></td>
<td>Lost</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>1%</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Partially intact</td>
<td>7</td>
</tr>
<tr>
<td></td>
<td>Lost</td>
<td>5</td>
</tr>
<tr>
<td>111 (TOTAL)</td>
<td>No data available for six months.</td>
<td></td>
</tr>
</tbody>
</table>
was undoubtedly the controlling factor in recent work by Graves which indicated that sealants must be applied soon after eruption to afford optimum protection against caries.

Early protection is obviously not possible in a service population. The low occlusal caries attack rate reported here supports the reasoning that the most vulnerable pits and fissures which would contribute to higher attack rates are no longer available in a study population from this age group. Reed in fact reported that the proportion of surfaces free of decay on the occlusal surface of the mandibular first molar decreases rapidly from 85% at age 5.5 to 21% at age 9.5 and remains relatively constant thereafter.

The 42% of all occlusal surfaces at risk in recruits from the Naval Training
TABLE VI - NEW CARIES BY LOCATION

<table>
<thead>
<tr>
<th>Tooth</th>
<th>Proportion of study teeth</th>
<th># Carious</th>
<th>Caries attack rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Upper</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1st molar</td>
<td>10.42</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>2nd molar</td>
<td>10.56</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>3rd molar</td>
<td>2.33</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>1st bicuspid</td>
<td>14.95</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>2nd bicuspid</td>
<td>13.44</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Lower</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1st molar</td>
<td>7.41</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>2nd molar</td>
<td>9.47</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>3rd molar</td>
<td>2.74</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>1st bicuspid</td>
<td>15.09</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2nd bicuspid</td>
<td>13.38</td>
<td></td>
<td></td>
</tr>
<tr>
<td>All</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1st molar</td>
<td>17.93</td>
<td>4</td>
<td>1.69%</td>
</tr>
<tr>
<td>2nd molar</td>
<td>20.03</td>
<td>8</td>
<td>3.03%</td>
</tr>
<tr>
<td>3rd molar</td>
<td>5.97</td>
<td>7</td>
<td>10.46%</td>
</tr>
<tr>
<td>1st bicuspid</td>
<td>30.96</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2nd bicuspid</td>
<td>27.02</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>99.99</td>
<td>20</td>
<td></td>
</tr>
</tbody>
</table>

Center, Great Lakes, were in those teeth (except for third molars) which survived the same environments which allowed decay in the remaining 58% sealant ineligible teeth.

Although the total number of new caries (20) was too small for more significant analysis, it should be noted that just one of 753 bicuspid (sealant and control) became carious. Among the remaining teeth, only the recently erupted third molars were attacked to a significant degree:

1st molar attack rate 1.69%
2nd molar attack rate 3.03% ≈ 1.69 
3rd molar attack rate 10.46% ≈ 3.03 

The caries attack rates, though derived from small numbers, suggest that a second order relationship exists between molar occlusal attack rates and duration of oral exposure. Consistent with the findings of Graves 20, these attack rates strongly suggest that if sealants are to be applied to molar teeth as a preventive measure, the treatment should be accomplished immediately after eruption.

The marked superiority in duration of retention of the commercially obtained sealant over the tinted sealant points out the importance of employing the exact test formulation whose characteristics are of interest. The tinted sealant specially supplied by the manufacturer for investigational use after comprehensive laboratory testing did not accurately reflect the retention characteristics of the clear commercial product provisionally approved by the American Dental Association for distribution to the dental profession.

The dye in the tinted sealant apparently interfered with ultraviolet penetration into the resin mass inhibiting polymerization. This effect would logically be greatest in the portion of sealant most removed from the light source at the critical tooth resin interface and would account for inferior retention performance of the tinted sealant.

Subjects were primarily recruit training camp graduates from the Naval Training Center, Great Lakes; Naval Training Center, San Diego; and Naval Training Center, Orlando. For the period 1970-1972 a mean DMFT of 11.2 was reported for recruits at the Naval Training Center, Great Lakes21. Mean DMFT for recruits from the
Naval Training Center, San Diego, was reported to be 15-20% lower, while no information was available for Naval Training Center, Orlando.

The mean DMFT for the study population was lower than that for newly enlisted Naval personnel at large. Undoubtedly, this was because of the minimum study criterion for one caries-free pair of 1st or 2nd molars which produced a study population with a mean DMFS (Decayed, Missing, Filled Surfaces) of 7.21 and a mean DMFT (Decayed, Missing, Filled Teeth) of 5.6. Evidently these young adults (26%; ca., one in four of all examinees) who have a sufficient number of occlusal surfaces to justify treatment in an efficient and economical fashion, do not benefit from its application.

Because the effect of this new treatment is still poorly defined and because of the low occlusal caries attack rates observed to date, the possibility that a measurable therapeutic effect will appear during the second year of the study is not entirely discounted. It seems certain at this point, however, that sealant application to the posterior teeth of young Naval personnel cannot be justified.

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