Original article:

Dimensional measurement accuracy of recent polyether and addition silicone monophase impression materials after immersion in various disinfectants: An in vitro study

1Dr. Sareen Duseja, 2Dr. Rupal J. Shah, 3Dr. Dipti S. Shah, 4Dr. Shilpa Duseja

1Reader, Department of Prosthodontics, Karnavati School of Dentistry, Gandhinagar
2Professor & Head, Department of Prosthodontics, Government Dental College & Hospital, Ahmedabad
3Professor & Head, Department of Prosthodontics, Karnavati School of Dentistry, Gandhinagar
4Reader, Department of Periodontics, Karnavati School of Dentistry, Gandhinagar

Corresponding Author: Dr. Sareen Duseja; Email id: drsareenduseja@gmail.com

Date of submission: 12 June 2014; Date of Publication: 25 July 2014

ABSTRACT

Introduction: The aim of this study was to evaluate and compare the long-term dimensional measurement accuracy of recent polyether and addition silicone monophase impression materials after their immersion in three disinfectants (dual phenol, 2% glutaraldehyde and 0.5% sodium hypochlorite) for 10 minutes and 1 hour.

Methodology: Two standardized stainless steel dies were prepared (ADA specification No.19) for making impressions with monophase addition silicone (Aquasil Ultra Monophase) and polyether (Impregum Soft) impression materials. A total of 140 impressions (70 with addition silicone and 70 with polyether) were made. Ten impressions of each material were allotted to each of the seven treatment groups: (1) No disinfectant immersion (2) Immersion in dual phenol for 10-minutes (3) Immersion in 2% glutaraldehyde for 10-minutes (4) Immersion in 0.5% sodium hypochlorite (NaOCl) for 10-minutes (5) Immersion in dual phenol for 1-hour (6) Immersion in 2% glutaraldehyde for 1-hour and (7) Immersion in NaOCl for 1-hour. Dimensional stability was evaluated after 24-hours, 1-week, 2-weeks and 4-weeks storage. Statistical analyses were performed using Separate 2-factor repeated measure ANOVAs and Bonferroni post hoc tests (α = 0.05).

Results: The expansion produced by disinfection in monophase addition silicone was found to be statistically insignificant (P>0.05) as compared to non-disinfected specimens. However, all disinfection protocols resulted in statistically significant (P≤0.05) expansion of polyether in comparison to non-disinfected impressions. There was significant shrinkage of both impression materials over time at room temperature. The dimensional changes at 4 weeks storage were found to be more than 0.5%, which is unacceptable in accordance with ADA guidelines. However, mean percent dimensional changes were found to be satisfactory after 2 weeks storage period.

Conclusion: The dimensional measurement accuracy of both disinfected and non-disinfected monophase addition silicone and polyether is affected by storage. However, all measurements met the ADA criteria even at 2 weeks storage. Irrespective of disinfection, the pouring of impressions after 4 weeks of storage is not advisable.

Keywords: Dimensional measurement accuracy, disinfectants, dental impression materials, glutaraldehyde, sodium hypochlorite.

INTRODUCTION

The routine dental procedures often expose the entire dental fraternity to a host of bacterial and viral micro-organisms. These pathogenic micro-organisms have the ability to cause severe infections which may, at times, be fatal. Tuberculosis, Hepatitis B and...
Acquired Immunodeficiency Syndrome (AIDS) are some of those infectious diseases that have high transmission rate in the dental office and dental laboratory. The transmission of viral pathogens implicated in AIDS and Hepatitis B through the saliva of infected individuals cannot be overlooked, as suggested in the literature. The dental impressions and casts are commonly infected with patient’s saliva and blood. Every precaution must be undertaken by the dental personnel who handle these materials. The Centers for Disease Control and the American Dental Association (ADA), therefore, recommend disinfection of dental impressions for all patients. Spread of potentially life threatening infections through contact with the contaminated impressions is quite a possible prospect. The most practical way to handle the impression is to disinfect it with agents that kill or deactivate the microflora. Sterilization damages the impression material, is time consuming and a more expensive method. Another method suggested to prevent cross-infection is the disinfection of gypsum casts either by immersion or spray atomization. Spray atomization, however, may prevent contact of disinfectant with all the surfaces of impression tray and impression material. The surface details of gypsum cast may be severely affected by immersion in disinfectant. According to the latest guidelines as stated by ADA, every impression should first be rinsed with water to remove saliva, blood and debris followed by its disinfection by immersing in a disinfectant chemical solution such as sodium hypochlorite, glutaraldehyde, phenol or iodophor. Furthermore, the British Dental Association states that every patient should be considered as a potential carrier of infectious disease and recommends thorough rinsing of impressions and suggests that technician should wear gloves necessarily while handling these potentially infectious materials. Similarly the Federation Dentaire Internationale also recommends chemical disinfection of all impressions and prostheses. Usually, disinfection is carried out without any consideration of the time required in achieving disinfection. Organization for Safety and Asepsis Procedures recommends 10 to 15 minutes exposure of impression to the surface disinfectant solutions. The transmission of potentially infectious pathogens from mouth by means of dental impressions and prostheses is a frequent occurrence in dental operatory. These potential pathogens include E. coli, S. aureus, P. aeruginosa, S. mutans and C. albicans. Hence, disinfection should be considered a routine procedure to be followed for all dental impressions to deactivate the pathogens in media (saliva, blood and debris) responsible for potential transmission of pathogens. Sodium hypochlorite is one of the oldest disinfectants used. It acts by forming hypochlorous acid that is lethal to most microbes. 2% glutaraldehyde (Cidex) is used routinely in disinfection of medical devices and instruments. Cidex is claimed to destroy 99.8% of Mycobacterium tuberculosis in 45 minutes at 25 degree Celsius. Dual phenols are less corrosive in contrast to phenols. The inherent hydrophilic nature of polyethers and some recent addition silicones (as claimed by manufacturers) may be responsible for dimensional changes after their immersion in disinfectants. The monophase materials have been formulated with sufficient shear thinning to be used both as low viscosity and high viscosity materials. Among all the elastomeric impression materials, polyether is hydrophilic but it is difficult to remove the
impression from the patient’s mouth owing to the high stiffness of set material. In order to reduce the stiffness, newer polyethers have been formulated with less silica filler content. In contrast, addition silicone is inherently hydrophobic but the material used in the present study has been claimed to be hydrophilic or smart wetting material by the manufacturer. This material contains increased amount of surfactants. The dimensional measurement accuracy of the set impression materials after disinfection may be adversely affected by the addition of these surface tension reducing agents. Earlier studies by Lepe X et al. concluded that polyether and addition silicone could be disinfected with glutaraldehyde for up to 18 hours without affecting its wettability. Thouati A et al. evaluated dimensional stability of elastomers after immersion in disinfectant solutions for 20 minutes. Sodium hypochlorite was found to cause expansion while glutaraldehyde had little effect on dimensional accuracy of elastomeric impression materials. Yilmaz H et al. described the effect of disinfectants (spray, 2% glutaraldehyde and 0.525% sodium hypochlorite for 10 minutes) on polyether and concluded that there were no significant dimensional changes when the impression was immersed in disinfectants for 10 minutes. Long-term dimensional stability of monophase addition silicone and polyether after disinfection was earlier studied by Walker MP et al. for up to 2 weeks of storage of impressions. Dimensional changes in impressions were found to be within ADA limits in their study. Most manufacturers suggest that the impression pouring can be done even after months of making impression. The present study evaluated the dimensional measurement accuracy after 1 month of storage of impressions made with monophase addition silicone and polyether. Another addition to earlier studies on these materials was the immersion of impression materials in 2% glutaraldehyde for 10 minutes and 1 hour and evaluation of the dimensional changes in monophase addition silicone and polyether after long-term storage.

Thus, the present study was undertaken with the aim of evaluation and comparison of dimensional measurement accuracy of recent polyether and addition silicone/polyvinyl siloxane monophase impression materials after their immersion in three disinfectant solutions (dual phenol, 2% glutaraldehyde and 0.5% sodium hypochlorite for 10 minutes and 1 hour exposure time) followed by storage over 4 week time period.

MATERIALS AND METHODS

I. Elastomeric impression materials:
   1. Addition Silicone/Polyvinylsiloxane- Aquasil Ultra Monophase (Dentsply/Caulk, Milford DE) with medium viscosity (Fig. 1a)
   2. Polyether- Impregum Soft (3M ESPE, St. Paul, MN) with medium viscosity (Fig. 1b)

II. Disinfectants:
   1. Dual phenolic solution (Prophene Plus, Certol International, LLC Commerce City, CO)
   2. 2% glutaraldehyde (Cidex, Advanced Sterilization Products, Irvine, CA)
   3. 0.5% Sodium Hypochlorite (Clorox, Clorox Co, Oakland, CA)

METHOD

(1) PREPARATION OF STAINLESS STEEL DIE:

Two standardized stainless steel dies were prepared according to the ADA specification No.19 for making
impressions of monophase addition silicone/polyvinyl siloxane and polyether impression material. According to the ADA specification No. 19, it consists of a cylindrical stainless steel block of 38 mm diameter, with a 30 mm diameter step on its superior surface. Dies were scored with three horizontal lines and two vertical lines on the top of impression surface. The horizontal lines were numbered as 1, 2 and 3 and the vertical lines were numbered X and X’ (Fig. 2). The distance between two horizontal lines was 2.5 mm and between two vertical lines was 25 mm. The horizontal and vertical lines on the die were scribed with the help of Nd-YAG laser treatment, with the width of 0.016 mm. Die had highly polished surface with a ring surrounding its periphery which served as a tray for containing the impression material (Fig. 3).

(2) PREPARATION OF THE TEST SPECIMEN (Fig. 4& Fig. 5):
Impregum Soft polyether was mixed using glass slab and cement spatula. Equal lengths of base and catalyst paste were dispensed. The impression material was carried to stainless steel die by means of an impression syringe (3M ESPE). Aquasil Ultra Monophase addition silicone impressions were made using an automixing impression gun (Dentsply/Caulk, Milfordlass, DE) to which cartridge of impression material was attached. An intraoral tip was attached to the mixing tip to line the impression surface of die with the impression material. Both the materials were pushed in zigzag manner with the tip embedded in the impression material to avoid air bubbles in set impression. Seventy impressions were made with both materials. Nitrile gloves were worn during application of Aquasil Ultra Monophase as latex gloves have been proven to inhibit polymerization of addition silicones. The manufacturers’ instructions were strictly followed during manipulation of these materials.

The ring that surrounds the periphery of die served as a tray for containing the impression material and height of the ring helped in maintaining constant thickness of impression material (3 mm). A cellophane sheet and a glass slab were placed on top of the ring. A 500g weight was placed over the assembly to maintain pressure on the impression. Simulation of oral environment was done in vitro by transferring the die along with impression to a water bath maintained at temperature of 32±2ºC. The time allowed for polymerization of materials was three minutes more than that suggested by manufacturers.

A total of 140 impressions were made (70 with monophase addition silicone and 70 with polyether). The study consisted of allotting 10 impressions of both materials (total 20) to each of the seven groups:

1. No disinfectant immersion
2. Immersion in dual phenol for 10-minutes
3. Immersion in 2% glutaraldehyde for 10-minutes
4. Immersion in 0.5% sodium hypochlorite (NaOCl) for 10-minutes
5. Immersion in dual phenol for 1-hour
6. Immersion in 2% glutaraldehyde for 1-hour
7. Immersion in NaOCl for 1-hour

After the above protocol, the impressions were rinsed with distilled water and air-dried. The impressions were then stored at room temperature.

(3) EVALUATION OF DIMENSIONAL STABILITY:
The dimensional accuracy of impressions was measured after 24-hours, 1-week, 2-weeks and 4-weeks storage to evaluate the dimensional stability. The length of middle horizontal line on the impressions was measured from X to X’ (Fig. 2) as
marked on the stainless steel die using Telescopic microscope (Fig. 6) at 10× magnification power of lens. The measurement was done three times and the average value of dimensional measurement accuracy was calculated. The same procedure was followed for all impressions in each of the groups. A comparison was then done between this measured value and the same measurement of the metal die used to make impressions.

The mean percent dimensional change in impressions was then determined for each sample by using the equation:

\[(\text{mean impression measurement} - \text{standard die measurement}) / \text{standard die measurement} \times 100.\]

(4) STATISTICAL ANALYSIS FOR DIMENSIONAL STABILITY:

The statistical analysis for evaluation and comparison of dimensional measurement accuracy within each impression materials by various disinfectants and protocols consisted of Separate 2-factor repeated measure ANOVAs and Bonferroni post hoc tests (\(\alpha = 0.05\)). The tests were used to evaluate each material in four conditions i.e. 24 hours, 1 week, 2 weeks and 4 weeks storage and then \(P\) value was calculated.

For each test \(P<0.05\) was regarded as significant.

RESULTS

Table 1 shows the mean impression measurements measured at four measurement times i.e. 24 hours, 1 week, 2 weeks and 4 weeks and Table 2 shows means of percent dimensional change between impressions and stainless steel die at different times of measurement. The mean impression measurements were less than the same measurement on stainless steel die manufactured according to ADA Specification No. 19 guidelines. This was due to the shrinkage of impression materials over time, which accounts for negative mean percent dimensional changes. The value of mean percent change in polyether after disinfection was less negative because the disinfected polyether impressions exhibited expansion in contrast to non-disinfected impressions. The results indicated no statistically significant \((P>0.05)\) expansion of disinfected monophase addition silicone in comparison to that of non-disinfected impressions. However, with polyether impressions, there was statistically significant \((P\leq 0.05)\) expansion following disinfection with any of the protocols. Statistical analysis by Separate 2-factor repeated measure ANOVA and Bonferroni post hoc tests indicated that there were significant values \((P\leq 0.05)\) of dimensional accuracy in both monophase addition silicone and polyether after the time interval of 24 hours, 1 week, 2 weeks and 4 weeks storage in ambient room conditions. All of the samples were found to exhibit continuous shrinkage over time. However, ADA specification 19 accepts any dimensional changes up to 0.5% [14]. Henceforth, it can be stated that all the impressions (either made with Aquasil Ultra Monophase or with Impregum Soft) followed ADA guidelines till 2 weeks storage period. It was further noticed that dimensional changes at 4 weeks storage period were more than 0.5% which is beyond ADA accepted range.

DISCUSSION

Accuracy and dimensional stability of the dental impression material is of utmost importance to achieve desired fit and function of either the removable or the fixed partial prosthesis. In recent trends, elastomeric impression materials have revolutionized restorative procedures, as compared to inelastic impression materials.\(^{15}\)Surfactants have been added to addition silicones by the manufacturers to
reduce the contact angle, improve wettability and simplify the pouring of gypsum models. This class with improved wetting characteristics is most accurately called hydrophilized addition silicone. Most commonly, non-ionic surfactants have gained importance in this area. These molecules consist of an oligoether or polyether substructure as the hydrophilic part and a silicone compatible hydrophobic part. The mode of action of these wetting agents is believed to be a diffusion-controlled transfer of surfactant molecules from the polyvinylsiloxane into the aqueous phase, thereby altering the surface tension of the surrounding liquid.\textsuperscript{16} As a result a reduction in surface tension and greater wettability of polyvinylsiloxane are observed. This mechanism differs from polyethers which possess a high degree of wettability because their molecular structure contains polar oxygen atoms which have an affinity for water. Because of this affinity, polyether materials flow into hydrated intraoral surfaces and are therefore cast with gypsum more easily than addition silicones. This affinity allows polyether impressions to adhere quite strongly to soft and hard tissues.\textsuperscript{16}

Impressions in fixed prosthodontics and other restorative procedures often involve use of heavy body elastomeric impression material in conjunction with light body material. The heavy body serves as custom tray to contain light body material which records finer tissue details. This method of making impressions is known as two-phase or dual-viscosity technique.\textsuperscript{17} However, in recent trends monophase technique has gained immense popularity in achieving desired results. In this monophase or single viscosity technique, impression material is used with either automix or cartridge mix system and the material can be mixed more homogenously without incorporating any voids. With mechanical mixing, mixing time is reduced and as a result more working time is achieved. In this technique, the material is mixed so that shearing action with rotation pushes the material forward in mixing tip. The pseudoplastic nature of the material permits reduction of its viscosity as it passes across cartridge and mixing tip to make the medium viscosity material to function as light viscosity impression material.

It was observed that polyether impressions disinfected with sodium hypochlorite exhibited stickiness on their surface. Special care was taken to handle those impressions. In contrast, polyether impressions immersed in dual phenol or glutaraldehyde did not exhibit any changes in surface details. All the disinfectants caused an expansion of Impregum Soft polyether irrespective of disinfection protocol. The sticky surface of polyether on immersion in sodium hypochlorite may be due to an adverse reaction between the two, in addition to disinfectant absorption. The negative mean percent dimensional changes suggest that the shrinkage of impression materials lead to decrease in their size on polymerization in contrast to same dimensions as measured on metal die. The values for disinfected samples were less negative as compared to non-disinfected samples. These findings were in agreement with those of Yilmaz H et al.\textsuperscript{11} and Walker MP et al.\textsuperscript{12} On the other hand, none of the disinfection protocols produced significant expansion of Aquasil Ultra Monophase addition silicones in contrast to those of non-disinfected ones. So it can be stated that this material is not sufficiently capable of disinfectant absorption. Thus, the behavior of monophase addition silicone still appears to be
hydrophobic rather than manufacturers claiming it as ultrahydrophilic and smart wetting impression material. The inherent hydrophilicity of polyether in contrast to addition silicone assures lesser contact angle and more wettability of polyether in aqueous environment. Impregum Soft used in the study has less filler content to reduce its stiffness. Lesser filler content implies more water absorption by the material. However, the expansion exhibited by polyether after immersion in disinfectants in this study was not beyond ADA specified standards, even with reduced filler content.

In the present investigation, the dimensional accuracy of Aquasil Ultra Monophase addition silicone and Impregum Soft polyether (disinfected and non-disinfected) was measured at 24 hours, 1 week, 2 weeks and 4 weeks storage period. The impression materials were found to undergo continuous shrinkage over time. The dimensional stability of these impressions was found to be acceptable for up to 2 weeks as the percent dimensional changes didn’t exceed 0.5%. However, further deterioration of Aquasil Ultra Monophase addition silicone and Impregum Soft polyether was noticed at 4 weeks as ADA suggested dimensional change limit was exceeded. The dimensional accuracy measurements after 4 weeks storage were not acceptable and the maximum shrinkage was 0.560% at 4 weeks. The clinical implication here lies in repouring of the impressions after long period of storage. Even though some manufacturers suggest pouring of impressions can be done even after weeks or months, this study recommended that any impression pouring after 4 week storage of impression results in unacceptable dimensional changes in impressions and should not be practiced. In nutshell, all dimensional accuracy measurements were found to be within ADA standards only up to 2 weeks of impression storage. It was further observed that almost all of the disinfectant absorption occurred within 10 minutes of immersion of impressions in disinfectants as the values of dimensional accuracy after 10 minutes of immersion were almost similar to values obtained after 1 hour of immersion. Furthermore, the sticky surface produced by sodium hypochlorite on polyether impression surface contraindicates its use as immersion disinfectant for polyether. However, any of the three disinfectants used in the study can be used for immersion disinfection of monophase addition silicones.

Further studies are required to evaluate these impressions materials when the clinical protocol is followed. The impressions were made on die which in no way simulates the oral environment. Besides, the casts were not prepared. When an impression is made in tray with tray adhesive, the impression shrinkage translates to oversized die which helps to compensate for casting alloy shrinkage.

CONCLUSION

The study can be concluded by stating that:

1. Irrespective of the disinfection protocols, Aquasil Ultra Monophase addition silicone and Impregum Soft polyether underwent continuous shrinkage over time. The pouring of impressions made with these materials after 4 weeks of storage, even in ambient room conditions, is not advisable as percent dimensional change was found to be more than that given by ADA. ADA specification No. 19 suggests $\leq 0.5\%$ dimensional change as acceptable. All measurements met the ADA standards at 2 weeks storage.
2. Aquasil Ultra Monophase did not exhibit significant expansion with any disinfection protocol. However, Impregum Soft exhibited significant expansion with all disinfection protocols. The surfactant modified monophase impression material still behaved as hydrophobic material. However, these dimensional changes were also within limits.

REFERENCES
Table 1: Mean Impression Measurements measured at four measurement times

<table>
<thead>
<tr>
<th>Impression material</th>
<th>N=10</th>
<th>24 hours</th>
<th>1 week</th>
<th>2 weeks</th>
<th>4 weeks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aquasil Ultra</td>
<td>24.924</td>
<td>24.904</td>
<td>24.898</td>
<td>24.861</td>
<td></td>
</tr>
<tr>
<td>Monophase</td>
<td>24.934</td>
<td>24.906</td>
<td>24.909</td>
<td>24.872</td>
<td></td>
</tr>
<tr>
<td>addition silicone</td>
<td>24.930</td>
<td>24.912</td>
<td>24.900</td>
<td>24.869</td>
<td></td>
</tr>
<tr>
<td>10-min glutaraldehyde</td>
<td>24.928</td>
<td>24.910</td>
<td>24.904</td>
<td>24.868</td>
<td></td>
</tr>
<tr>
<td>10-min NaOCl</td>
<td>24.955</td>
<td>24.930</td>
<td>24.918</td>
<td>24.874</td>
<td></td>
</tr>
<tr>
<td>1-hr dual phenol</td>
<td>24.936</td>
<td>24.923</td>
<td>24.908</td>
<td>24.873</td>
<td></td>
</tr>
<tr>
<td>1-hr glutaraldehyde</td>
<td>24.928</td>
<td>24.912</td>
<td>24.901</td>
<td>24.860</td>
<td></td>
</tr>
<tr>
<td>Impregum Soft</td>
<td>24.935</td>
<td>24.918</td>
<td>24.897</td>
<td>24.860</td>
<td></td>
</tr>
<tr>
<td>polyether</td>
<td>24.960</td>
<td>24.942</td>
<td>24.928</td>
<td>24.874</td>
<td></td>
</tr>
<tr>
<td>10-min glutaraldehyde</td>
<td>24.960</td>
<td>24.938</td>
<td>24.924</td>
<td>24.872</td>
<td></td>
</tr>
<tr>
<td>10-min NaOCl</td>
<td>24.963</td>
<td>24.945</td>
<td>24.933</td>
<td>24.873</td>
<td></td>
</tr>
<tr>
<td>1-hr dual phenol</td>
<td>24.968</td>
<td>24.936</td>
<td>24.937</td>
<td>24.875</td>
<td></td>
</tr>
<tr>
<td>1-hr glutaraldehyde</td>
<td>24.958</td>
<td>24.928</td>
<td>24.928</td>
<td>24.872</td>
<td></td>
</tr>
<tr>
<td>1-hr NaOCl</td>
<td>24.974</td>
<td>24.944</td>
<td>24.938</td>
<td>24.874</td>
<td></td>
</tr>
</tbody>
</table>

N=sample size for each group in each material

Table 2: Means of percent Dimensional change between Impressions and Metal Die

<table>
<thead>
<tr>
<th>Impression materials</th>
<th>N=10</th>
<th>24 hours</th>
<th>1 week</th>
<th>2 weeks</th>
<th>4 weeks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aquasil Ultra</td>
<td>-0.304</td>
<td>-0.384</td>
<td>-0.408</td>
<td>-0.556</td>
<td></td>
</tr>
<tr>
<td>Monophase</td>
<td>-0.264</td>
<td>-0.376</td>
<td>-0.364</td>
<td>-0.510</td>
<td></td>
</tr>
<tr>
<td>addition silicone</td>
<td>-0.280</td>
<td>-0.352</td>
<td>-0.400</td>
<td>-0.524</td>
<td></td>
</tr>
<tr>
<td>10-min glutaraldehyde</td>
<td>-0.288</td>
<td>-0.360</td>
<td>-0.384</td>
<td>-0.526</td>
<td></td>
</tr>
<tr>
<td>10-min NaOCl</td>
<td>-0.180</td>
<td>-0.280</td>
<td>-0.328</td>
<td>-0.502</td>
<td></td>
</tr>
<tr>
<td>1-hr glutaraldehyde</td>
<td>-0.256</td>
<td>-0.308</td>
<td>-0.368</td>
<td>-0.506</td>
<td></td>
</tr>
<tr>
<td>Impregum Polyether</td>
<td>1-hr NaOCl</td>
<td>10-min dual phenol</td>
<td>10-min 2% glutaraldehyde</td>
<td>10-min NaOCl</td>
<td>1-hr dual phenol</td>
</tr>
<tr>
<td>-------------------</td>
<td>-----------</td>
<td>-------------------</td>
<td>--------------------------</td>
<td>-------------</td>
<td>-----------------</td>
</tr>
<tr>
<td></td>
<td>-0.308</td>
<td>-0.260</td>
<td>-0.160</td>
<td>-0.148</td>
<td>-0.128</td>
</tr>
<tr>
<td></td>
<td>-0.352</td>
<td>-0.328</td>
<td>-0.232</td>
<td>-0.220</td>
<td>-0.256</td>
</tr>
<tr>
<td></td>
<td>-0.396</td>
<td>-0.412</td>
<td>-0.288</td>
<td>-0.268</td>
<td>-0.252</td>
</tr>
<tr>
<td></td>
<td>-0.562</td>
<td>-0.560</td>
<td>-0.504</td>
<td>-0.508</td>
<td>-0.500</td>
</tr>
</tbody>
</table>